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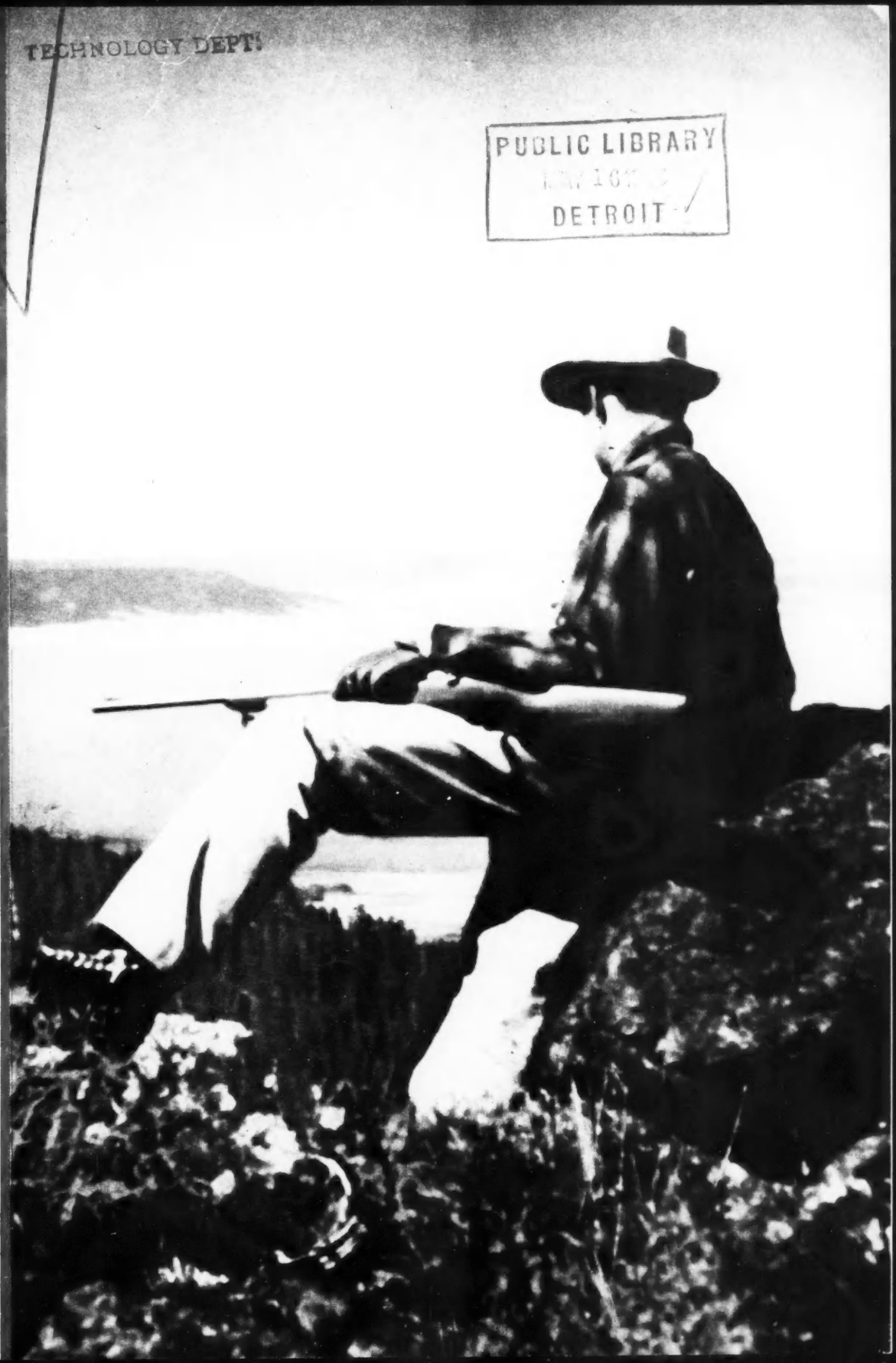

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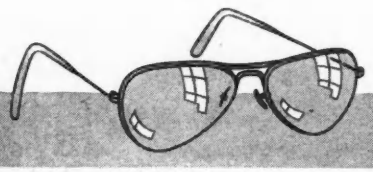

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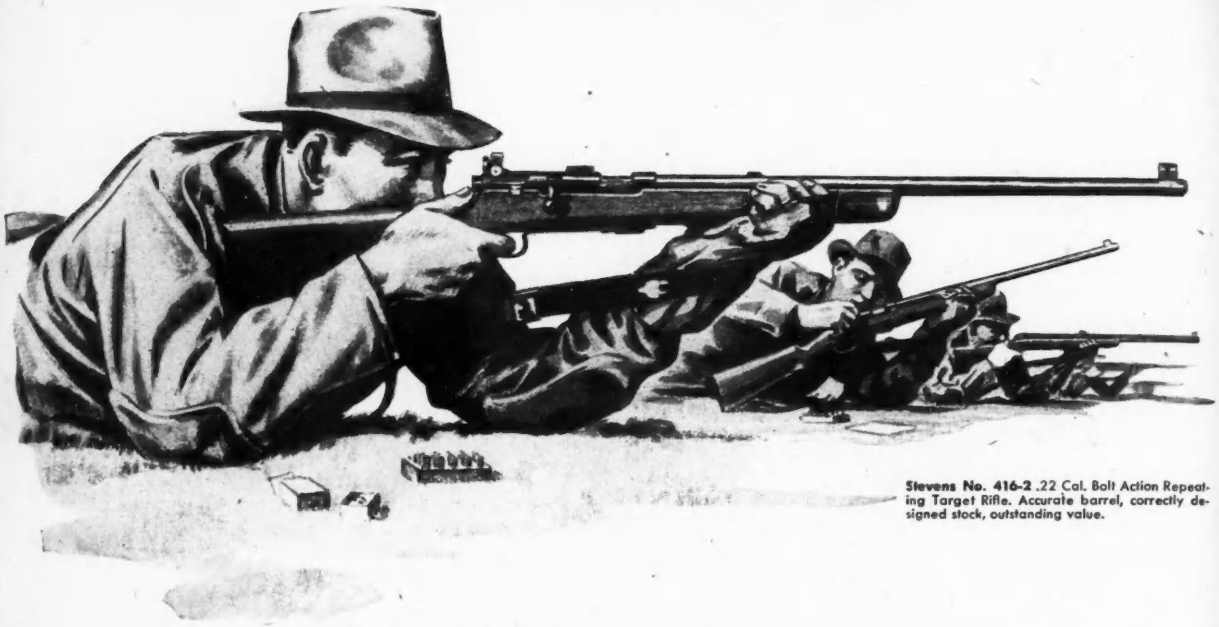

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CONFESSION OF AN ARMS MAKER WHO'S WAY BEHIND SCHEDULE

We're afraid we owe a big apology and explanation to all of you who have been waiting so patiently to equip your post-war shooting kits — and we're just as sorry as you that the dealers' shelves aren't yet loaded with brand-new K-22 Masterpieces, 357 Magnums, Kit Guns, and all the other models we have in the works for your shooting pleasure.

We don't like alibis any more than you do, so we won't pretend the delay is somebody else's fault. Yes, we've had our labor problems and we've run into steel shortages that bottlenecked production badly, but in all honesty the blame is really ours for being over-ambitious.

When the whistle blew on V-J Day, we looked the situation over, rolled up our sleeves, and stuck our necks right out. Sure, we still had 40,000 guns to finish up for the Government, but we'd take care of them in no time and have the Military & Police service revolvers to fill urgent police needs by November or December, K-22's by the first of the year, Magnums and heavy-frame guns by Spring, and the little 22/32 Kit Guns with the other light-weight models by Summer.

We've been chewing on that schedule ever since with double shifts in some departments, and things are beginning to move. The 40,000 Government guns were completed on April 4th, initial shipments on the square-butt Military & Police started the second week in March, and production is climbing day by day.

However, as soon as the first Military & Police Revolvers went out, we found demand was way beyond our expectations. In many ways, we'd like to be making K-22's and guns for sporting use, but the M & P is essential for law-enforcement work, and naturally that has to come first.

Unfortunately this will mean postponing production on the new K-22, K-32 and K-38 Masterpieces as well as all the other models that come later. The more we see of reconversion, the more we'd like to duck making predictions, but we know how important time is to anyone who's been waiting for his new gun, so here's how things line up right now:

The square-butt Military & Police Revolver is in good quantity production with shipments being made about 6-8 weeks after orders are placed, and we're gaining all the time. Most of the guns are in 4 and 5-inch barrel lengths with blue finish, but a few 6-inch and 2-inch guns are coming through as well as some with nickel finish.

We haven't been able to start any M & P's with round-butt frames yet, but we'll try to fit some in before too long.

The new K-22, K-32 and K-38 Masterpiece Target Revolvers are now scheduled for first shipments late in June, and we want to do everything possible to get them going just as quickly as we can. However, we have a tremendous backlog of orders and if you've been waiting for a Masterpiece, it would be wise to get your name on your dealer's waiting list right away.

The 357 Magnum and other heavy-frame models come next, and though here we're running into something that's pretty much dependent on how production goes on the Military & Police and Masterpieces, it looks as though we'll have them ready by late Summer, with the 22/32's and light-weight guns following next Fall.

Reconversion is making us too old and grey to guarantee this schedule, but we'll make every effort to live up to it, and we hope you all will continue to be patient with us during the months to come. You can be sure there's no loafing going on up here in Springfield, and we'll try to make the day come soon when we can serve the Sportsmen of America normally once more.

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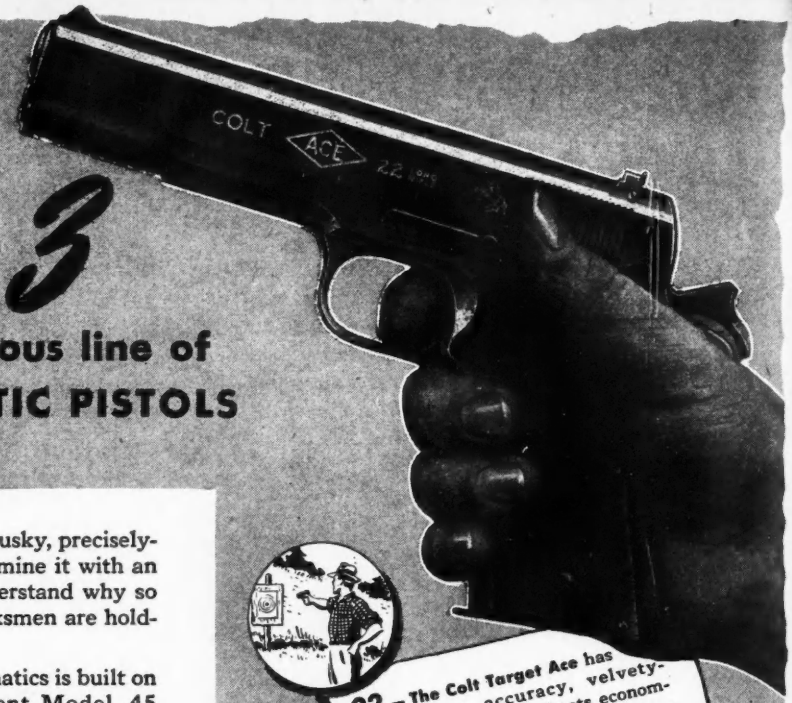

Pick up any one of these husky, precisely-balanced automatics – examine it with an eagle eye – and you'll understand why so many sportsmen and marksmen are holding out for a Colt.

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The AMERICAN RIFLEMAN

Official Journal of The National Rifle Association of America

VOLUME 94 NUMBER 1

MAY 1946

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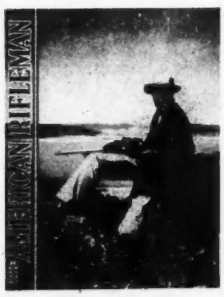

COVER

This month's cover neatly sums up the thrill of getting back to a rifleman's holiday unmarred by war. The photo was taken by Mrs. Carl Jensen, San Mateo, during a hunting trip in Modoc County, California. The subject: her husband, photographed as he looked over the shooting possibilities around distant Goose Lake. For our camera fans, the shot is a Kodachrome, f 6.3 at a twenty-fifth, with a Kodak 35.

PUBLISHED MONTHLY BY THE NATIONAL RIFLE ASSOCIATION OF AMERICA, 1600 RHODE ISLAND AVENUE, WASHINGTON 6, D. C. DOMESTIC RATES (NORTH, SOUTH, AND CENTRAL AMERICA) $3.00 A YEAR; $5.00 FOR TWO YEARS. ELSEWHERE, $3.60 A YEAR; $6.50 FOR TWO YEARS. ENTERED AS SECOND-CLASS MATTER, APRIL 1, 1908, AT THE POST OFFICE AT WASHINGTON, D. C., UNDER ACT OF MARCH 3, 1879.

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FOR CHANGE OF ADDRESS, GIVE BOTH NEW AND OLD ADDRESS AS THE LATTER APPEARS ON ADDRESS LABEL.

WILLIAM GREENER SAID....

. . . SOME SCORCHING WORDS ABOUT NINETEENTH CENTURY GUNMAKERS' ADVANCED IDEAS

By C. CLARK

***"Gunmaking is the profession of a man of mind: Any man or any workman cannot make a gun, working by square and rule as other mechanics do; no, the true gunmaker is an artist."*—W. Greener.**

BACK IN THE DAYS of beaver hats, sideburns and gold-headed canes, when Mr. Barrett of Wimpole Street was having trouble with daughter Liz, and whisky, watch chains, and parental control were all noted for their heaviness, there lived and worked in Birmingham, England, a gunsmith—one William Greener. Now Bill Greener was no ordinary gunsmith; in fact, if you asked him he would tell you that he wasn't a gunsmith at all. "A gunsmith," he would snort, "is but a mere mechanic, a filer of locks." And right off the bat you would begin to sense that Bill was a man of strong opinions.

He started in the business of gun— er, gunmaking, in 1829, just fourteen years after Dictator Napoleon had been overthrown at Waterloo. Later he moved to Birmingham to be near the center of Britain's tool trade. After the Napoleonic wars a new era of peaceful living swept over the Old World and the New; and a steady stream of inventions featured the next forty years. People describe it today as the industrial revolution.

It was the golden age for gunsmiths; detonating material gave rise to percussion caps, and barrels started to get "groovy." From the start, Greener had established a first-rate reputation for his gun barrels. He was good, all right, but he knew it. In fact, he only admitted two equals in the business, Joe Manton (who taught him his trade) and Westley Richards. In Greener's early career the making of steel was unknown, but he made first-rate gun barrels out of wrought iron, and his Damascus barrels were things of beauty. Like all good gunsmiths, he loved the metal he worked and on one occasion he said: "I could twist and retwist iron until from the beautiful and interesting results, it would become with me a sort of monomania."

He was always studying metal, and when axles broke on the newly established English railroads, Greener was quickly there to examine the fracture and try to find the cause. He made the suggestion that hollow axles might help to overcome the fault. Early steamboat boilers often blew up and he investigated over a hundred explosions to see what caused them. Whether it was an anchor shank or a shotgun barrel that gave way, Bill Greener wanted to know why.

There were a lot of cheap guns being made in Birmingham in the fifties, and sweaty men in leather aprons worked a sixteen-hour day pounding out barrels in the heat of open fires. They would fashion six pounds of iron (worth two and a half cents a pound) into a barrel for a profit of thirty-one cents. This was in the days when the African slave trade demanded shiploads of cheap guns, smoothbore muzzle-loaders retailing for as low as $1.30 apiece, and guaranteed to blow up at the slightest overload.

The expanding fur trade in the American West witnessed many an Indian buck deposit his stack of furs at a trading post, and stalk off the proud owner of one of these "portable exploders" as Greener termed them.

Greener, the man of violent opinions, was disgusted with this trade and he carried on a vigorous campaign against the makers of "trade junk." He published their costs and their profits, and constantly lobbied for a better law for proof testing barrels. An Act passed in 1815 had been passed up by almost every gunmaker since. Most of the "gyp" dealers forged their own proof marks, and sometimes (for good measure) added in a graceful scroll the name of some reputable maker long since dead or out of business. Greener, the craftsman, jealous of Birmingham's reputation as a gun center, worked hard for better legislation, and he finally met with success in 1855 when a new law was enacted. It called for double proofing, once in the rough and once after assembly. There were stiffer penalties for evasion. The gun trade under Greener's leadership had started to clean house.

Of Greener's work there is plenty of record, and the old boy was a first timer with many experiments in penetration and velocity. He fired muzzle-loaders under every sort of condi-

tion. Once a ball bounced back from a vertical metal plate and cut the brim off his hat. On another occasion (wildcatters, please note) he loaded up a smoothbore muzzle-loader, weighing seventeen pounds, with 330 grains of Curtis & Harvey's diamond grain powder, stoppered with a one-ounce ball "fitted tight with the thinnest patch procurable." The barrel was thirty-six inches long, caliber .662, and the net result was to punch a hole clear through half an inch of wrought iron. With what seems a touch of disappointment Greener noted: "but the bullet went only a few yards further." He was puzzled about this test for he had it all figured out that the ball was traveling *in excess of 21,000 feet per second*. However, he let himself out with the notation, "I cannot but imagine that there exists some error."

To check something or other he once filled a rifle barrel plumb full of powder, screwed a metal plug in each end, and holding the barrel in his hand touched a match to the nipple. He said he watched "the escaping fluid coming out of the small orifice like steam from a pipe." If you want to do this trick, he cautioned, "put a towel around the barrel to protect your hand."

His numerous experiments were all to the end that better barrels would result, but the inventive genius of others left him cold. This was too bad, for between 1837 and 1867 greater advances were made than in the previous hundred years, and one might say (with the exception of automatic arms) since then to the present day. In those three decades British military arms changed from smoothbore flintlock to percussion rifled arms, and on to breech-loading central fire with wrapped brass cartridges. And calibers were reduced from .750 to .450.

But our old friend Greener couldn't see any of it; every time he was confronted with an advanced idea, he would mutter, like the farmer who saw the giraffe for the first time, "There ain't no such animal." When grooved rifling came into vogue Greener announced, "the musket will be with us for centuries to come." And when a friend complained that his early percussion-type Colt leaded up after fifty shots (for lack of lubricated bullets) Greener wrote "The fouling of the barrel by lead is absolute proof that the bullet does not follow the course of the grooving; in its passage through the directing barrel, it passes straight out with the velocity imparted to it in the chamber."

Of revolvers in general he said: "There are many defects to be overcome (though it is doubtful whether they will ever be) before revolvers can in any degree be relied upon for constant operation . . . the double-barreled, under-and-over pistol was entirely discarded for the new toy; but hopes are entertained that the former will soon be restored to the lost preference of all who value their own safety, and would rather depend on two certainly destructive shots than six uncertain ones."

But the boys kept right on bringing out something new every year. No sooner had Bill Greener got reconciled to grooved barrels than the first French breech-loading shotguns appeared in Britain. Old Bill looked upon them as something immoral, what you would expect from the French. What was the matter with a well-made, muzzle-loading shotgun? Wasn't it perfect? Of course, it was. "Yet," said Greener, "in the face of this high state of perfection, certain English gunmakers introduce and recommend to their patrons as an improvement a description of a gun possessing the following negative qualities: First, there is no possibility of a breechloader ever shooting equal to a well-constructed muzzle-loader. Second, the gun is unsafe and becomes more and more unsafe from the first time it is used. Third, it is a very costly affair both as regards gun and ammunition." There was more self-comfort than wisdom in his final remark: "No fear need be entertained that the use of breechloaders will become general."

Somebody remarked that the breech-loading principle might be applied to cannon, and Bill was right there with a downright: "The production of a perfect breech-loading cannon is so problematical as to amount, in my humble opinion, to nearly an impossibility."

In those days, the chief problem for makers of military arms was to get a bullet with clearance enough to slide down an excessively fouled barrel, yet hug the grooves on the return journey. In 1836, Greener had the idea of a plug applied to the spherical ball, the explosion to force in the plug and expand the ball's diameter. An official test resulted in thumbs down for half the balls lost the plugs in flight, and anyway it was only an accident if the plug faced the explosive charge. Greener always maintained that he had been sabotaged, and when Captain Minié of the French Army brought out the conoidal bullet with the plug-in-the-base idea old Bill swore up and down that Minié had filched his brain child. He pestered the Government so much that, to keep him quiet, they compensated him to the extent of a thousand pounds, but adopted Minié's bullet for the Army. It had a short career, and was superseded by Pritchett's round-nosed bullet.

Like his aversion to change, Greener had a horror of machine methods in gunmaking. In 1851, when Sam Colt paid a visit to London to lay the groundwork for an English plant, the

British Government (as if by Lend-Lease) sent a commission to the U. S. to study machine methods in gunmaking. Greener's opinion on machine methods, after studying Colt's product, effectively banishes factory production. Said he, "The mechanical construction of Colt's pistol is effected entirely by machinery, and on this account superiority is claimed for it. In my opinion, however, the boasted benefits of machinery have never yet been realized. . . . I have not yet been able to discover anything in Colt's manufacture to make me advocate the use of machinery."

You can imagine Greener's thoughts when the experts returned from the U. S. and incorporated a lot of trans-Atlantic ideas in the Government's new arms factory, established at Enfield Lock near London. Here a new rifle was turned out, the first Enfield, last muzzle-loader to be used by British troops. In no time they were being turned out at the rate of 1,100 a week, and Greener must have sensed the doom of Birmingham's lucrative government arms contract. Little was it dreamed that nearly a million of these original Enfields would one day find their way to Civil War battlefields.

In its day the Enfield was considered quite a gun. For a hundred and sixteen years British troops had used variations of Brown Bess, the last innovation being the .720 Brunswick, a muzzle-loader with two deep grooves to take a belted ball. The new Enfield, caliber .577, had a forty-two-inch barrel, and was rifled with three narrow grooves having a twist of one in seventy-eight inches. The round-nosed, 520-grain Pritchett bullet used in the Enfield was seven-eighths of an inch long. A radical idea was the paper cartouché holding powder and ball already rolled. For speedy loading you merely bit off the twisted end of the cartridge, poured in the powder, rammed down the bullet, and then capped the nipple. Rapid fire was four to five shots a minute.

To Greener, who had never taken kindly to improvement, the Enfield was second cousin to a Buck Rogers disintegrator. But worse, much worse was to come.

One day in the late fifties, a young Manchester toolmaker named Joseph Whitworth, feeling rather self-conscious and embarrassed, reported at the English School of Musketry at Hythe to give a demonstration of a gun he had made. Whitworth's specialty was the manufacture of micrometric gauges and lathes; and he had put in untold hours making a muzzle-loader with a hexagon (or six-sided) bore.

This job was .450 caliber, with a twist of one in twenty. The conoidal bullets he brought with him were a combination of lead, tin, and manganese, one and three-eighths inches long, and each one carefully turned up in a lathe.

With a select committee of brass hats viewing the performance (and remember this was nearly ninety years ago) the Whitworth gun put ten shots in a twenty-inch group at 500 yards. The Enfield's group was very much wider. Increasing the target distance fifty yards at a time, the rival guns boomed and smoked. At 1,400 yards the committee recorded: "The Enfield ceased to afford any further data for comparison," which was a nice way of saying that the Enfield had ceased to connect with the target. At 1,100 yards, it was noted, Toolmaker Whitworth's precision job was smoking in a ten-shot group that equalled the Enfield's performance at 500 yards. And Whitworth methodically continued (the test took a week) putting his shots on the target up to 1800 yards. In tests for penetration it was the same story: The Whitworth hexagonal bullet tore through thirty-three inch elm planks to lodge in an oak block. The Enfield bullet stuck in the thirteenth plank.

Although it was a great week for Whitworth, he failed to get the official nod. Perhaps the new Enfield plant loomed larger in the Government's plans. Anyway Whitworth returned to his native Manchester, to subsequently win fame and fortune (and a knighthood) as a maker of naval guns and armor plate.

Greener attacked the Whitworth rifle in great spirit. He said that Whitworth had hoodwinked the authorities by using a double charge of powder, that the gun was unsafe, and if it were left loaded for two hours it would blow up on discharge, on the theory that the close-fitting bullet would be hard to move down the barrel.

A few years before his death (in 1869) old Bill Greener had another shock, when the British Government adopted Jacob Snider's breech-loading mechanism for the Enfield.

When Greener died, his son W. W. Greener took over the business, and grandsons are probably now at the helm. But while we can smile at the old boy's aversion to change, it's with the tolerance all gun lovers have for the master craftsman. What Greener made in his painstaking way was tops; and he laid sound foundations for a firm of gunsmiths, whose 115-year tradition of craftsmanship and quality gunsmithing is known wherever arms are carried. ♦ ♦ ♦

National Interscholastic Rifle Champions. The Christian Brothers Academy, Albany, N. Y., is the 1946 winner of the Alamo Trophy, NRA award symbolizing top team honors in the National Interscholastic Rifle Championships. The Academy's No. 1 team, scoring 747 x 800, topped over 100 entries in the eighteen regional matches which constituted the nation-wide event. Stadium High, Tacoma, Wash., was second.

Robert Murphy, Abraham Lincoln High, New York City, captured the National Individual title with 193 x 200. The Girls Team title was won by Malden (Mass.) High, and individual honors by Lorraine Barnes, Oakmont (Pa.) High.

An Editorial

"The History of Liberty—"

IN reference to our March editorial ("Registration—Confiscation")—a young lawyer wrote: "There is nothing in the history of our country to indicate that registration would lead to confiscation." That argument, naive and specious, has been heard before. It is an excellent example of the ease with which intelligent, well-meaning, patriotic Americans are misled into supporting the firearms registration campaign.

Think a moment. Was there anything in the history of 19th Century France to indicate that a diminutive Corsican lieutenant of artillery would one day become the master of the French people and the near-master of Europe?

Was there anything in the history of imperial or democratic Germany to indicate that a toothbrush mustached Austrian corporal would one day become master of Germany and near-master of Europe?

Was there anything in the history of enormous, sprawling, Czarist Russia to indicate that a Georgian peasant would one day rule all the Russians with a greater ruthlessness than the most ruthless of the Czars?

There was nothing in the history of the United States to indicate that the ideology of the Austrian Hitler and the Georgian Stalin would find fertile fields for simultaneous development in America—at the expense of the ideology on which our own country had grown to greatness.

There was nothing in the history of our country to indicate that the Government of the United States would abrogate its contract with its own citizens and require those citizens to accept paper in payment of government obligations guaranteed in gold.

There was nothing in the history of our country to indicate that an Attorney General of the United States would one day tell a Federal Court that "the court should not substitute its judgment for that of the Executive" (Attorney General Biddle, May 1, 1944, at Chicago).

Certainly this is no time for witch-hunting but it certainly is no time for a revival of the smug complacency of the "it can't happen here" school which had its rosy-tinted spectacles smashed to bits by Jap bombs at Pearl Harbor!

Not long ago, U. S. Supreme Court Justice Frankfurter said: "That which three years ago had seemed to five successive Courts to lie within permissible areas of legislation is now outlawed by the deciding shift of opinion of two Justices. What reason is there to believe that they or their successors may not have another view a few years hence? Is that which was deemed to be of so fundamental a nature as to be written into the Constitution to endure for all time to be the sport of shifting winds of doctrine?" This was not the moaning of a "reactionary" but the measured thinking of a wise "liberal" who recognized the danger to American institutions in the prevalent tendency to disregard the precedents of American history. In the light of such testimony, how can we rest assured that registration of privately owned arms will not eventually lead to confiscation? Are we justified in saying "it can't happen here because it hasn't happened before in America"?

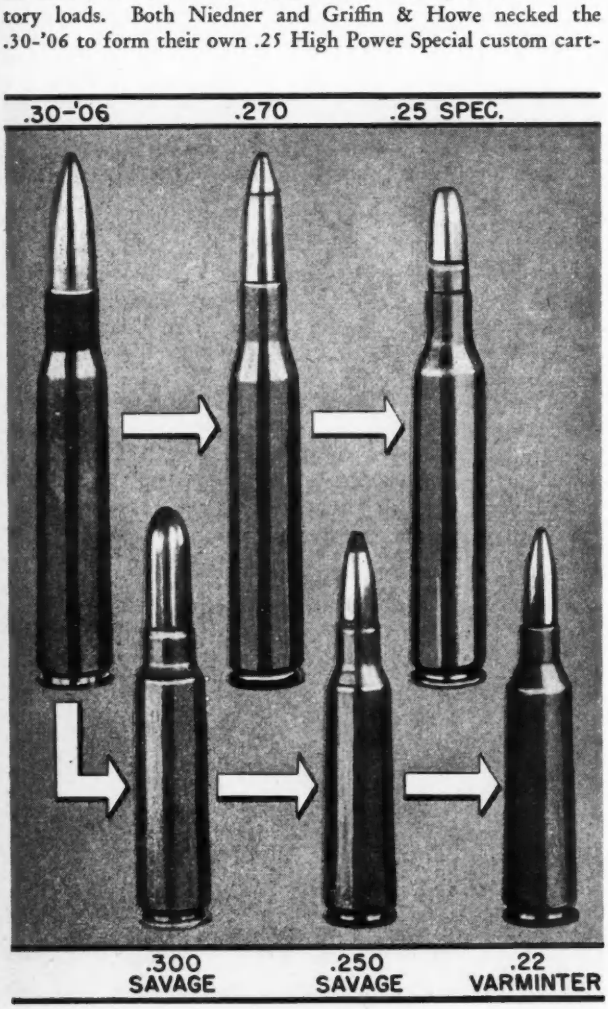
Woodrow Wilson said, in 1912: "The history of Liberty is the history of the *limitation* of governmental power, not the increase of it. When we resist, therefore, the concentration of power, we are resisting the processes of death, because concentration of power is what always precedes the destruction of human liberties."

The registration of firearms privately owned by reputable citizens is one of the steps toward "concentration of power" which the thinking citizen of a democracy will resist to the end.—C. B. L.

.22 CENTER FIRES IN

IT MIGHT BE WELL TO REMIND OURSELVES occasionally that all our wildcat cases are made from standard factory loads. All wildcats, as well as most custom loads and many factory cartridges, were designed by altering and reforming some previously standardized cartridge. The .30-'06 is a neck-shortened Model 1903 cartridge and, in effect, the .300 Savage is a short version of the .30-'06 and the .250 Savage a necked-down .300 Savage. Then the .250 Savage was necked down to make the Gebby .22 Varminter. This latter became practically a custom cartridge when J. E. Gebby registered its name for his own standard of chamber dimensions and J. B. Smith made and sold custom loads to fit all Gebby Varminter rifles. These .22-250 wildcats remain unstandardized.

Also, in effect, the .270 Winchester is a necked-down .30-'06, and the .257 Roberts a necked-down 7 mm. Mauser, and the .22 High Power Savage a necked-down .25-35 Winchester. By the same token, the .32-20 was necked to .25-20 and the latter to the .218 Bee. That reads like a list of wildcats, but all are factory loads. Both Niedner and Griffin & Howe necked the .30-'06 to form their own .25 High Power Special custom cartridge for which they had factory cases made for their own custom rifles. Factory cartridges were made for the .256, .30, and .35 Newton rifles as well as for the short-shoulder .300 Hoffman Magnum custom rifle, while the standard .22 Hornet cartridge was factory produced before anything except custom rifles were available. The chamber and cartridge dimensions of the .22 Hornet were standardized in 1931. The Model 23-D Savage Hornet rifle was announced a year later, in the summer of 1932, while the Model 54 Winchester Hornet rifle was announced early in 1933. All were preceded by the German .22 Vierling.



When Hervey Lovell, an Indianapolis gunsmith, necked down the .25-20 Single-Shot case to hold 45-grain, .224-inch Hornet bullets, he called his new wildcat the .22-3000 Lovell, the second figure advertising its estimated muzzle velocity. After he announced it in the summer of 1934, it was copied by every other gunsmith in the land, and converting Hornet rifles to take this .22 wildcat cartridge became the bread-and-butter business of most gunsmiths. It continued to exist as a wildcat, despite its great popularity, because all attempts at standardizing Lovell chamber dimensions failed although B. L. Smith, of Toronto, Ontario, published a book on it.

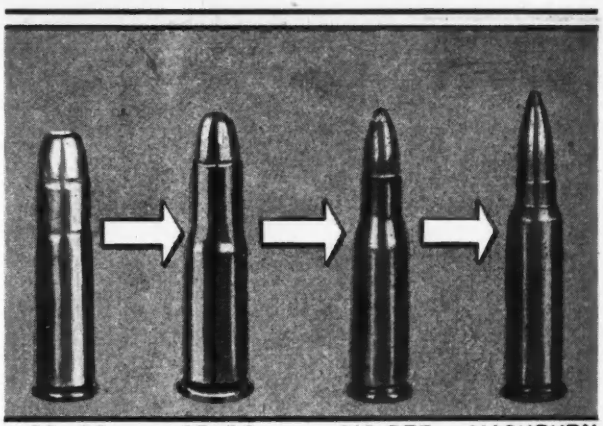
Harvey Donaldson, of Little Falls, New York, remembered that the .32 Winchester Special had been designed by forming a shoulder on the straight-taper, .32-40, low-pressure case and that this change had served to burn more completely the military-type smokeless powder that had failed to burn completely in the .32-40 High Power. It had developed combustion well enough to make practical a HiSpeed factory load with a light 110-grain bullet in the .32 Winchester Special. So, Harvey hurried up the Mohawk Valley to Hubbardsville and had his friend, Shirley Risley, make a reamer for him. The second try, or No. 2 Risley reamer, did the job, and the writer happened to be visiting Donaldson at the time of its acceptance and accompanied him when he returned to Hubbardsville. This No. 2 Risley version of the .22 Lovell became known by the abbreviation 2R Lovell, often reversed to R2 Lovell. As made by Griffin & Howe and J. B. Smith, both having cases factory made, it became a custom load. However, the 2R was immediately copied by a host of other gunsmiths without standardization of chamber dimensions and was so doomed to remain a wildcat. The bullets and propellants developed for the .22 Hornet and its small-size, noncorrosive primers made possible the fine .22 Lovell practical ballistics.

The advent of the .22 Hornet was somewhat different because it was less haphazard. Our best high-velocity .22 Long Rifle bullet dropped more than five inches between fifty and one hundred yards, and it did not kill small game any too well except on perfectly placed hits over short ranges. The .25 Stevens had been neglected and was on the way out. The flat-tip, 45-grain, lead bullet of the .22 Winchester Rimfire killed better than the round-nose, 40-grain Long Rifle bullet, but not much, and the better bullet was less accurate as far

An authoritative and comprehensive examination into the origin and capabilities of some of our most talked-about small-caliber hunting loads.

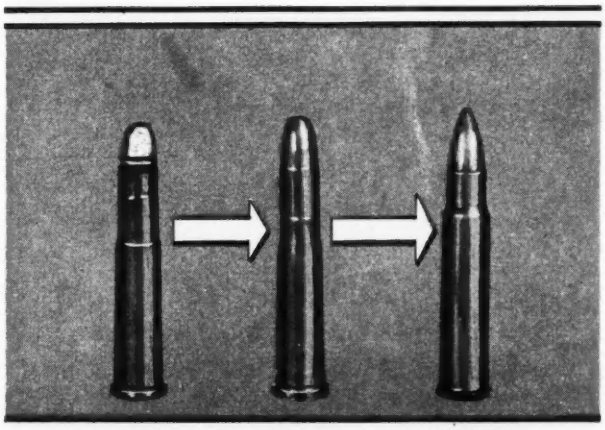
REVIEW

By F. C. NESS

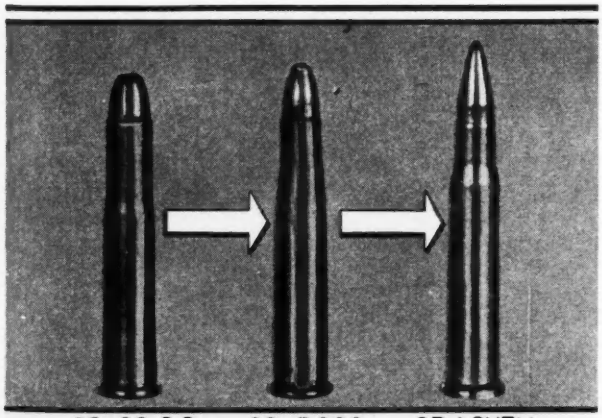


as proper placement was concerned. The same bullet was available in the .22 Winchester Centerfire, known as the .22-13-45, but it was loaded with thirteen grains of FFFg black powder and dirty. The soot was circumvented by priming with three grains' weight of bulk smokeless and adding enough black powder to make a full thirteen grains. Some loaders reversed this by using three grains black powder and seven grains Bulk Shotgun. A heavy load of straight smokeless, No. 80 or Sharpshooter, was less accurate, hard on cases, and with the old-style primers, ruinous to bores. So, our vermin shooters sought a better .22 cartridge and our experimenters were busy. Among these was my friend Grove, the late Captain G. L. Wotkyns. The jacketed bullet was the key to success and, to get it, the 5 mm. Velo Dog full-metal jacket bullet was swaged and reversed to form a Soft Point in a weight of about forty-five grains.

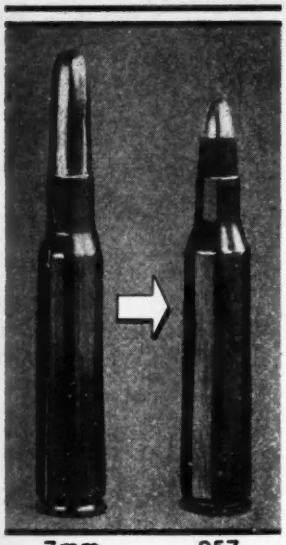
Grove announced his Wotkyns .22 Express in 1930. He obtained the interest of influtial ballisticians and the cooperation of ballistics laboratories in powder plants, ammunition factories, and at Springfield Armory. In a year the wildcat became standardized as the .22 Hornet. The first Winchester cartridge, loaded with a 45-grain Soft-Point bullet and 10.8 grains of No. 1204 du Pont smokeless powder, developed 2,350 foot-seconds muzzle velocity. It was extremely accurate up to 100 yards, practical on ground hogs, turkey, and foxes up to 150 yards, and had a pleasingly flat practical trajectory over 175 yards with a high-placed target scope zeroed an inch high at 100 yards. When the first factory rifle was announced for the .22 Hornet, Remington announced a HiSpeed load having a muzzle velocity of 2,600 foot-seconds and developing a muzzle energy of 675 foot-pounds. This was followed by those of other makers who announced 2,625 foot-seconds muzzle velocity. These high-velocity loads were as accurate and killed ground hogs more emphatically, but were not as well liked by turkey hunters who preferred the original load.



The Staynless primer was announced with the original load by Winchester, and handloaders got busy boosting charges up to the safe working limits of the rifle which meant a pressure of 40,000 pounds. The load of No. 1204 powder was increased to 11.5 grains behind a lighter 35-grain bullet, and the velocity went up to 2,492 foot-seconds at a pressure of 33,760 pounds per square inch. The HiSpeed velocity of 2,600 foot-seconds was obtained at 37,430 pounds pressure with a load of 12.1 grains. The limit load was 12.5 grains giving 2,692 foot-seconds at 40,580 pounds. Then Hercules No. 2400 powder appeared and the 35-grain bullet was given nearly 3,000 foot-seconds muzzle velocity. A 40-grain bullet reached 2,850 foot-seconds, but the 45-grain standard weight stopped at 2,600 foot-seconds and that became the standard for all factory Hornet loads.



The .22 Hornet could take off the head of a squirrel up to 100 yards and shoot possibles all day at that range, although the four-inch ten-ring of the 200-yard Decimal target was too difficult for it. The factory ammunition was not as expensive as more powerful loads, and it was relatively noiseless and inoffensive in farm areas that held taboos against these heavier varmint loads. As soon as it became popular its shortcomings became apparent. Even with the heaviest handloads it did not



7mm. MAUSER .257 ROBERTS

kill ground hogs well beyond its practical range of 150 yards nor hit crows reliably beyond that range. The velocity was insufficient to prevent frequent and disturbing ricochets of its jacketed bullets. H. Guy Loverin, of Lancaster, Massachusetts, developed a lead-alloy, gas-check bullet for handloaders that could take the standard high velocity of 2,600 foot-seconds muzzle velocity. This 43-grain cast bullet is listed in the Ideal Handbook as No. 225438. It was shaped like the round-nosed Long Rifle bullet, and it too would ricochet from the ground at the lower velocities generally used.

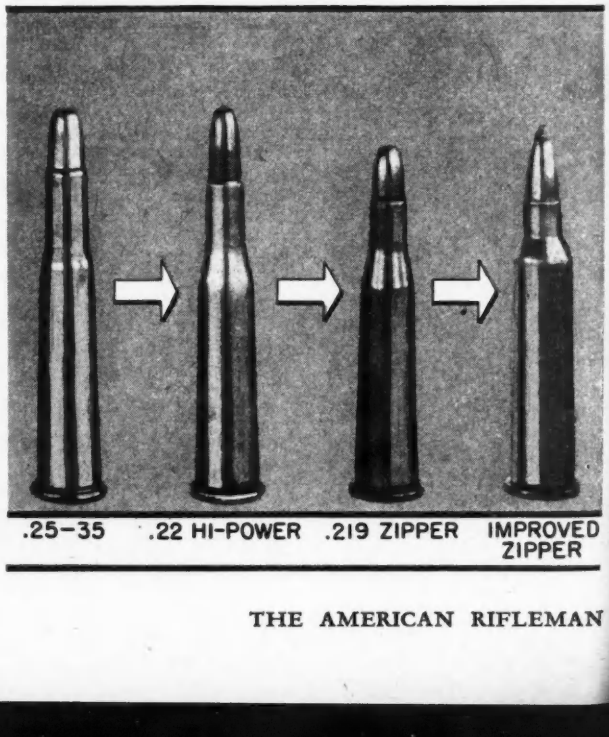
The most serious criticism of the Hornet rifle by its users was that it changed zero from day to day, as such frequent shifting of the impact cannot be tolerated in varmint shooting. However, the Hornet had no inherent fault that could possibly cause it to shift its zero more than any other caliber in any properly bedded rifle and stock. The true cause of the trouble, of course, was the low sectional density of the light bullet and its unfavorable velocity that made it sensitive and responsive to the whims of every zephyr or air current. All these defects inspired experimenters to improve the load by increasing the capacity of the case. They lengthened the body at the expense of the neck and put an abrupt shoulder on it. The first of these called to my attention was the Zoerb abrupt-shoulder Hornet case, but Lysle D. Kilbourn aggressively advertised his version, and the Kilbourn-Hornet, or K-Hornet, became the most prominent Hornet wildcat.

The attractiveness of the K-Hornet lay in the fact that it would fit and function in standard Hornet box magazines and chambers. Those who used the .22 Hornet in order to avoid handloading found no advantage in the K-Hornet, but handloaders could continue to use factory ammunition with equally reliable and accurate results in their K-Hornet chambers and then reload the reformed case with one and one-half grains' weight more powder for improved ballistics. The gain in muzzle velocity was sufficient to extend the effective range fully fifty yards with better killing effect and with fewer ricochets as compared with the heaviest Hornet handloads. The heaviest K-Hornet handloads, in practical field shooting, equalled the performance of the earlier .22-3000 Lovell in every respect plus providing better brass cases and the advantage of accepting factory ammunition, not true of the displaced wildcat.

The factories responded with the .218 Bee which drove a 46-grain, .224-inch bullet at a muzzle velocity of 2,860 foot-seconds, or nearly 300 foot-seconds faster than the .22 Hornet. This little bottleneck cartridge was made shorter than the .22 Hornet as the latter was too long for the action of the Model 1892 Winchester lever-action rifle. The new Bee was virtually a necked-down .32-20 for which cartridge the Winchester repeater had been regularly made. It was not unlike the Baby Niedner wildcat that A. O. Niedner had made and sold years earlier by necking the .32-20 case down to .22 caliber. The factory Bee was as accurate as the Hornet in equal rifles and gave more killing power and a flatter trajectory, but the improvement was not great enough to lift it out of the Hornet category as to practical range and effectiveness in the game field. Two immediate advantages accruing from the increased velocity were fewer ricochets from ground impacts and less wind drift of the bullet owing to the more favorable bracket of the Bee velocity as compared to that of the Hornet. It was a fine little varmint cartridge for ranges up to about 175 yards, and with the Model 65 Winchester repeater, it provided a particularly fine combination for short-range varmint shooting, or up to 125 yards. This latter was a rifle limitation.

For our experimenters the .218 Bee cartridge provided a case of modern brass much better than that of the ancient .25-20 Single Shot used for the 2R Lovell wildcat. The most prominent conversion of the Bee was the .218 Mashburn Bee, whose chamber would accept the standard factory ammunition. Since the Mashburn Bee was a 17-grain case like that of the 2R Lovell, took the same loads, gave the same ballistics, and performed as accurately at all distances, the 2R Lovell was rendered obsolescent. Both of these wildcats with full loads equalled the field ballistics of the old .22 Niedner Magnum that A. O. Niedner had made years before by necking the .25-35 Winchester case to .22 caliber. For falling-block Single-Shot actions, this was one of the most popular wildcats of its time. So the Mashburn Bee supplanted two of the most popular wildcats for varmint shooting up to 250 yards.

Our factories sought a parallel to the .22 Niedner Magnum. The factory .22 High Power Savage already utilized a similar case, but for .228-inch heavy bullets of 70-grain weight. Now the Savage Arms Corporation experimented with this case and .224-inch bullets. It worked well with Hornet bullets but was not sufficiently promising of a profitable exploitation to ever become adopted, although regular working loads at 50,000 pounds pressure gave the 45-grain bullet fully 3,700



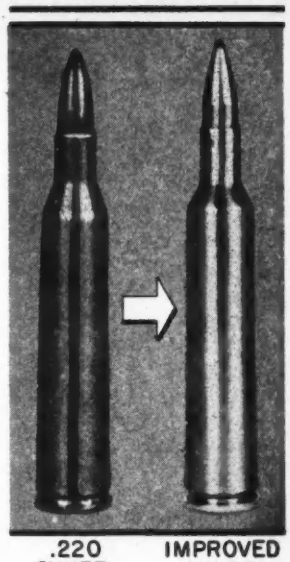
.25–35 .22 HI-POWER .219 ZIPPER IMPROVED ZIPPER

foot-seconds muzzle velocity with loads recommended by the powder maker. Winchester research brought out a new cartridge of this type for their Model 64 lever-action repeating rifle and .224-inch bullets, called the .219 Zipper. It drove the 46-grain bullet at 3,420 foot-seconds muzzle velocity and the 56-grain at 3,100 foot-seconds muzzle velocity. These rifles were accurate, with cold barrels or for three-shot groups, and were, therefore, practical for field shooting. Because of their compactness and smooth outline for the saddle scabbard, the combination appealed to Western range riders. In custom rifles the cartridge and its handloads shot well in some and fairly well in others. It gave fine accuracy, as required in varmint shooting, only in occasional rifles, and among the more particular varmint shooters there was no enthusiasm for the new load.

Our experimenters liked the quality of the modern brass case used in the .219 Zipper cartridge, and went to work on improving its shape from their standpoint. The shoulder was sloped more abruptly and the powder capacity slightly increased. There were many of these Zipper-type wildcats, but the best ones were designed to take factory Zipper ammunition in the same chamber. Typical examples were the Improved Zippers made by Clarence A. Hill and by Parker O. Ackley. All of these were finely accurate for long-range varmint shooting, and the field ballistics with 55-grain bullets equalled those of the factory .220 Swift 55-grain cartridge. The new Zipper brass was best, but other rimmed cases of suitable length and diameter were also used for forming the Improved Zipper wildcat. Among these were the .22 High Power Savage, the .30-30, and even the old .32-40. The case shape and dimensions were practically those of the .22-250 or Gebby Varminter wildcats.

So far, we have dealt with the development of small-bore varmint cartridges only of rimmed type suitable for falling-block Single-Shot actions. For strong bolt actions, larger rimless cases and more powerful loads are, of course, practical. The .22-250 or Gebby Varminter, already mentioned, is a rimless wildcat designed for the .250 Savage case, but made also on the entire rimless series of similar head diameter, including the .30-'06, 8 mm., 7 mm., .256 Newton, and .257 Roberts. Of these, the latter provides the best modern brass and the .250 Savage the poorest on account of the weak or faulty heads of many lots. Those modern 7 mm. cases that have heavy webs or strong heads are among the best. Except for its apparent ability to perform well with a wide range of medium to full loads, hence its greater flexibility, there is not any advantage over the Swift to be found in the Varminter. Both are finely accurate and equal when equally made by custom methods. The disadvantage of the Varminter is that it is restricted to handloads or only to custom loads when they are to be purchased.

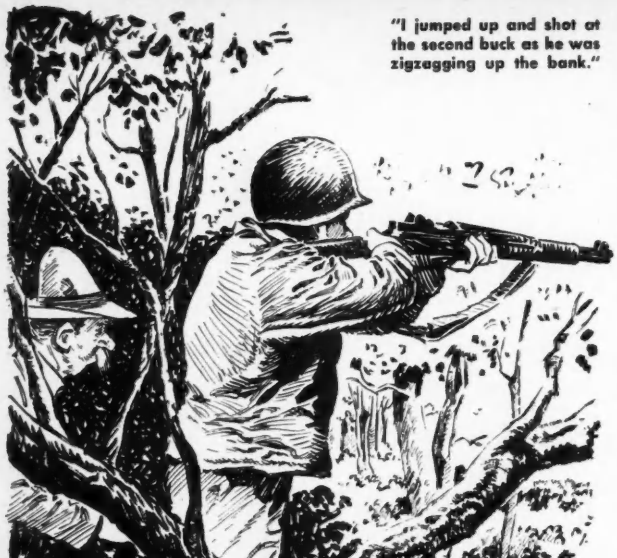
In the fall of 1935, Winchester announced one of the best varmint loads, and the finest factory cartridge ever developed for those varmint shooters who used long ranges in their hunting. This was the semirimless .220 Swift and the strong, smooth, accurate Winchester rifle for which it was made. It drove 46-grain, hollow-point and pointed, 48-grain, soft-point, .224-inch bullets at 4,140 foot-seconds muzzle velocity. The speed, flat trajectory, and destructiveness of these Swift bullets over 300 yards gave our varmint shooters new concepts of practical field ballistics and set new standards of performance for their chosen sport. The peculiar killing effect at this new high-velocity bracket made these tiny bullets effective on deer and antelope up to 250 yards. With the Swift, the writer has killed deer beyond that range and antelope at more than twice that distance. There was also announced a load that had a 56-grain bullet at a muzzle velocity of 3,760 foot-seconds. This was later supplanted by a better-shaped, pointed, 55-grain factory bullet whose exterior ballistics became the criterion for all .22 wildcat developments and for experimenters who strove to match it using various rimmed and rimless cases.



In the standard .220 Swift sporting rifle the light 48-grain pointed bullet developed a free recoil of less than five pounds with a muzzle energy of 1,833 foot-pounds, something unheard of before. At 100 yards, it had nearly 3,500 foot-seconds remaining velocity and its average accuracy was less than one and one-half minutes of angle extreme spread. At 200 yards it had 2,760 foot-seconds remaining velocity and an average spread of one and one-half minutes. At 300 yards the spread was less than two minutes of angle with 2,265 foot-seconds remaining. With scope zeroed on aim at 200 yards, the bullet was practically on aim at fifty yards, about an inch above at 100 yards, while less than five inches below at 300 yards.

The 56-grain bullet, not pointed, had 3,060 foot-seconds remaining at 100 yards, and nearly 2,000 foot-seconds remaining velocity at 300 yards. The average accuracy and relative impacts were the same as quoted for the 48-grain above. The improved Winchester 55-grain pointed bullet has about the same ballistics, except that it starts at 3,720 foot-seconds and has 3,250 foot-seconds remaining at 100 yards. Although its impacts are, technically, slightly inferior to those quoted for the others above, they are practically the same and this is the best .220 Swift factory cartridge for long-range field shooting, particularly in windy varmint country. Several smaller wildcats equal these field ballistics with their pointed 55-grain bullets, but of all those based on the strong-webbed modern Swift case, the type exemplified by the Ackley Improved Swift and the Weatherby Rocket, are best because they permit the unrestricted use of factory Swift ammunition in their chambers.

Our experimenters found fresh inspiration from the intriguing ballistics of the .220 Swift. The Ashurst .22-'06 aimed at 4,500 foot-seconds with light bullets and over 4,000 f. s. with 55-grain bullets, and his handloads did register such velocities. Grove Wotkyns claimed 4,000 foot-seconds muzzle velocity for the heavier 63-grain Sisk Express bullet from his .22 PMVF or .22-'06 CCC on the .30-'06 case. Neither of these nor the Wotkyns-Wilson .220 Arrow wildcat, however popular, can accept factory ammunition, thus do not qualify for the writer's gunrack. Even bigger unbalanced .22 wildcats have been formed from belted Magnum cases but, so far, none of these has justified its excessive powder consumption nor the rapid rate of bore erosion resulting from its total or partial combustion of disproportionate powder charges. ◆ ◆ ◆



"I jumped up and shot at the second buck as he was zigzagging up the bank."

European Deer Hunt: Yankee Style

By R. J. ACKART

AGAINST THE ROCKY HILLSIDE a roe deer buck was perfectly silhouetted. His gray February coat contrasted the wet, black rocks and sparse growth. The sight picture was perfect, too—black front post touching just above and to the rear of the shoulder joint. It was a long shot, perhaps 300 yards across the stream-channeled ravine, but the buck remained still, and I had all the time I needed for a perfect hold and squeeze. My heart pumped noticeably, as it always does when I look at game through a sight, but I had a comfortable sitting position and the sling helped keep that front post just where I wanted it. Yes, everything was like a textbook picture when my shoulder felt the backward push of the Garand. I looked up over the sights to see how far the buck would roll, and I surely felt funny inside when I saw him bounding up the hill like a mountain goat.

Having missed that first shot, I knew a second one thrown at a buck giving a fair imitation of a snipe would be useless. Boy, was I in for a ribbing! I had so talked up hunting and target shooting, had so vehemently favored accuracy of fire over volume of fire, that my fellow officers had come to think of me as the son of Daniel Boone and Annie Oakley. And now I had committed the unpardonable error of going out after game without first sighting in my rifle.

The Regiment had just taken Hellenthal, a small town that nestles into the hills near the Rohr River of Germany, and the amount of sign I had seen in the surrounding forest enticed me out after deer despite the fact that both friendly and enemy artillery whistled and screamed overhead. It was raining just enough to drown out the sound of footsteps, and I anticipated good still-hunting. I had borrowed a GI Garand rifle and two clips of ball ammo, but I had failed to adjust the sights, and the sick feeling inside me was my punishment for such a greenhorn mistake.

After using the rest of the one clip in sighting the rifle to shoot to point of aim at 200 paces, I hunted on up the ridge. During the next hour I saw plenty of sign but no deer, and so I figured the artillery fire had scared them all into the thick stuff that grew along the streams. I was carefully hunting up toward the first of these thickets that lay in my path and was within ten yards of it when "all hell broke loose" right in front of me. At first I thought an artillery "short" had exploded, and then I saw what I believed to be a black horse getting up just inside the thicket, making a mighty loud racket amid the winter-dead brush. And then I saw the biggest rack of deer horns I ever hope to see—a red deer buck. The animal took one jump of at least twenty feet and disappeared into the heart of the thicket. I had been carrying the rifle across my chest, as a grouse hunter carries his gun, because I knew snap shooting would be the order of the day, but I had not even pushed off the safety much less raised the butt to my shoulder, and my second chance of the day was lost.

And what a chance! Red deer bucks are not too plentiful and are mighty suspicious animals, hard to still-hunt successfully. The European "sports" get them by sitting in blinds built up on twenty- to thirty-foot stilts and having windows that overlook small clearings. They wait there for a buck to come out for his evening browse or, perhaps, to be driven out by the local peasantry. I suppose that is why those foreign rifles so frequently have set triggers and high-mounted four- or six-power scopes. Such equipment might be OK when the rifle is resting on the window ledge of a cabin-in-the-sky type of blind, and the target is taking his time crossing a clearing.

I hunted until I figured dusk would overtake me before I could get back to our Battalion C.P. and then started homeward, thinking of one hunting trip back in the States when I had hunted five days in a row without even seeing a deer and wondering if ever again I would get such opportunities as I had had that afternoon, opportunities I surely had muffed. Suddenly I snapped out of my brooding reverie—just why I did not know. Something I had seen out of the corner of my eye most likely. I stopped still and searched the ground all

IN A RESPITE FROM WAR, OUR GI MAN-KILLING EQUIPMENT IS TURNED ONTO SOME OLD WORLD GAME WITH INTERESTING RESULTS

around me. There was nothing unusual. A second look. Yes, what the deuce was that? Something like a pair of rabbit ears, but mighty peculiar. Slowly I let myself down onto a fallen tree to study the situation. These things did look like ears sticking up over the grass tops, but in the failing light and at seventy-five yards I could see no motion. The longer I looked, the more certain I became that ears they were, and some more looking made me believe there were small spikes of horns between them. Moving as slowly as I could, I cocked my legs up on branches so that I could have a semblance of a sitting position anyway, put the top of the post just below and between the base of the ears and, though I was wobbling a bit, squeezed her off. The ears disappeared, kerplunk.

Sixty-nine long paces took me to my trophy, a roe deer buck. He was of average size, about five or six years old, twenty-six inches tall at the shoulder, and sixty pounds in weight. His new-looking antlers were eight inches long, just a bit less than the length of his head. My bullet had grazed his cheek, entering his neck at a sharp angle and ranged on back, cutting the big vessels of his neck and chest, and had made an exit wound about the diameter of my little finger just to the rear of his chest cage. The full-patch bullet had hit no bone, traveled straight through about fifteen inches of deer, and had expanded to no appreciable extent; yet the deer was as dead as though hit by a .270. Later experience, however, caused me to have little regard for the full-patch bullet as a dependable game getter.

That night my fellow officers kidded me about going out after deer and bringing home an "overgrown jack rabbit," but I noticed they ate roe deer liver with gusto.

The tactical situation permitted me to hunt the same ridge the next day, too, and someone talked me into carrying the .30 caliber carbine instead of the Garand. He did not have to talk very much because toting nine and a half pounds of Garand up that ridge had been no easy job, and I welcomed the five-and-a-half-pound carbine. At that time the L-type rear aperture sights on our carbines had not been replaced by the new adjustable receiver sights, and so I had no sight adjusting to do. On my way I fired a couple of shots at a stone in a stream and satisfied myself that the fixed sights were as accurate as I was at 100 yards, shooting offhand. The Garand pushes out military full-patch bullets that travel with about the same ballistics as .30-'06 sporting bullets, whereas the carbine shoots a 110-grain bullet with a thin metal jacket at 2,000 f.s. muzzle velocity to produce about 900 foot-pounds of striking energy. The carbine cartridge is definitely light, lighter than the .30-30 which is under so much discussion as a deer slayer.

"Mr. Beer"

Taking that carbine was a mistake. On my first hunt I had failed to sight in my rifle and had lost a buck. On that second hunt I failed to take enough rifle for the job and lost enough deer meat to feed the battalion. What was worse, I let a couple of deer go off with 110-grain slugs in them. I ran into more deer that day than most men see in a lifetime, for I had the luck to find where the deer were hiding, scared as they were by the continuous artillery fire. I saw at least twenty deer, but there I was with a popgun. My first shot of the day was at a roe buck that was a bit smaller than my previous day's bag. He was trotting off at a forty-five degree angle to me, so I shot for just behind the rib cage, believing the bullet would course on through to the chest cavity. He stumbled but did not fall, and ran off with a tottering gait, obviously a very unhappy and unhealthy deer. He left a heavy blood trail for about 200 yards, leading to where he had lain or fallen even though I was right behind him and making no effort to go quietly. There was a regular puddle of blood where he went down, but I could not track him beyond that point, and after half an hour of combing the area for the deer or his trail, I gave him up, hating the carbine and hating myself.

My next opportunity was one of a lifetime. A big red deer doe was feeding on grass just over the crest of a small rise. When her head went down I slipped a few feet nearer; when she looked up I froze. I got to within thirty-five yards of her before I figured it was trigger time. The rise was blocking off the lower chest, so I aimed for the spine just behind the withers and fired. The doe went down, but the thrashing around I heard made me run to the crest. A glance told me my bullet had gone where I wanted it, for the doe's hindquarters were down and she was trying to drag herself with her front legs. But another red deer doe was there, too, no more than twenty yards from me. This other doe, hidden from me by the rise, had evidently frozen at the noise of the shot, and my bursting onto the scene had just brought her back to life and action. She was broadside to me, executing the well-known maneuver of "getting the hell out of here." I fired at her chest and saw her stride break momentarily. A second shot went smack into a tree; there was no opportunity for a third try.

I turned around to find that the first doe had dragged herself about five yards and was resting from the exertion, head up,

forelegs braced wide apart. I shot for the base of her skull, saw her flop over on her side, and went after the second doe. I found where this other deer had been when hit, for there was a clump of hair beside a scuff mark I figured she made when her stride broke. Further on there was some frothy blood on a bush through which she had crashed. I felt sure she had a chest wound and examined darn near every leaf in the area but I never found her.

Several other opportunities, usual deer shots, came my way that afternoon, but I refused to take them. Two deer left for the foxes were two too many for me. I went back to dress out the doe I had killed and then set out for "home," juggling the slippery liver and heart. A bush on the edge of a thicket about fifty yards from me suddenly started quivering and shaking a bit more than could be explained by the breeze. I ducked behind a fallen log and lined up the carbine sights on the bush. Our lines were thin and it was known that several Krauts had succeeded in infiltrating through them. And, here I am prompted to put in one of those parenthetical asides to the effect that if deer carried rifles, the few hunters still living at the end of a season would certainly know deer hunting. I am sure I was more successful as a deer hunter in woods I knew

"Slowly I let myself down onto a fallen tree . . ."

might contain an armed enemy than I had ever been in the peaceful American deer haunts. Nonetheless, the question of deer or Kraut was soon answered when out trotted my friend, the big buck which the day before had bounded up within ten yards of me and got away before I pushed off my safety. Instinctively I swung the carbine onto him. He was cutting straight across and the sight picture was like the Lyman trade-mark. But then I remembered the doe with a hole in her lung and satisfied myself with just a good look. He was too magnificent a creature to insult by shooting at him with the carbine, even though he was a German deer.

Yes, the carbine might have killed him, or stopped him. A .22 rim fire might kill a big deer, too, if the bullet manages to get to a vital spot, but I know of no man who would choose a .22 for a deer hunt. Losing two deer with a carbine has made me sincerely hope that no man will ever choose that rifle when he goes out after our American game animals.

With use the Garand rifle appealed to me more and more while the military ammunition appealed to me less and less for deer hunting. Full-patch bullets were not designed as game getters, and I would not recommend their use as such if anything else is available. According to my observations, a full-patch bullet may or may not open up, whether it hits bone or not. I have seen it expand in the paunch, and I have seen it go through both shoulders making an exit wound no bigger than the entrance. I have seen it expand symmetrically like a Core-lokt bullet, and I have seen it keyhole through the chest and paunch to make the worst mess imaginable, going through the animal in a spiral, and S-curve, or a segment of a circle. Depending upon just how the bullet acts, the killing or shocking power varies. Sometimes the bullet seems to blow up like a .270 to give a quick kill; sometimes it expands to act like a heavy, slow bullet such as the .45-70, knocking down the deer no matter where it lands; and sometimes it goes clear through the animal like a stiletto.

I saw no difference in the action of full-patch bullets that could be accredited to range and, accordingly, to velocity. The deer I shot in the open at 250 yards or more had all the various types of wounds as did the deer I shot in the woods at thirty-five to seventy-five yards.

V-E Day found us in Pilsen, where we remained for a two-week rest. Regimental headquarters was located in part of the mansionlike home of the owner (or maybe it was President or General Manager) of the big brewery of Pilsen, and this gentleman, whose name I could never remember much less pronounce correctly, was a sportsman. He extended an invitation to the Regimental Commander for a deer hunt on his outlying estates, and that invitation passed down "through channels" to me, where, I can assure you, it stopped. Mr. Beer—I'll call him that—received me most graciously in those private rooms of his house which he and his family used and showed me his trophy room and the few rifles and shotguns he had successfully cached away from the Germans. The number of his trophies, including those of an African trip, and the excellence of his sporting arms made my mouth water, but the appearance of Mr. Beer, when regarded from an American deer hunter's point of view, was a bit disappointing. He was a short, fat little man with a ventral protuberance that testified to the excellence of his brewery. He was dressed in fashionable tweeds, with all the accessories, including a tie. I tried to picture him climbing a ridge and wondered what sort of a hunt we could have together, but we piled into my jeep for a twenty-mile drive to the main gate of the estate where we picked up the gamekeeper, a weathered old fellow.

Mr. Beer did some explaining. We would drop him off at his favorite blind, and then the gamekeeper would take me on to another one. Mr. Beer's blinds were not quite so fancy as the cabins-in-the-sky I had seen in Germany; they were just platforms in trees, but comfortable enough. The stand the gamekeeper chose for me was near the edge of a field, the platform being arranged in such a way that I could not see into a certain sector of woods because of heavy branches. He explained that the females had yarded up in the thickets there to drop their fawns and would stay together in the woods, maintaining a regular maternity ward and nursery, until the youngsters could take care of themselves. The bucks maintained their old habits and visited the fields each morning and evening, going along the same trail at approximately the same time every trip. He went on to say that three bucks used the two trails I could cover from the stand: A big seven-year-old would come up the left-hand trail at 8:15, and two younger fellows would come up the right-hand trail at 8:35. "Now it is 7:45. We keep silence, yes," he concluded.

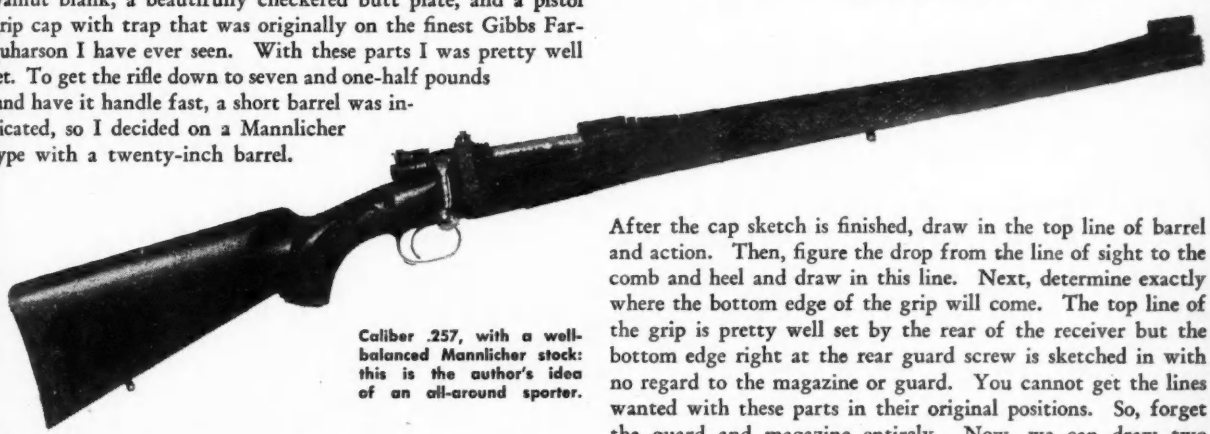
The wait did not seem very long, and 8:15 came quickly enough, but no buck sauntered up *(Continued on page 30)*

Getting the Gun You Want

By MORGAN G. HOLMES

BUILDING A RIFLE FROM AN IDEA in a man's mind is usually quite a job. But how the work is started often makes the difference between getting what is wanted in a gun or taking what happens to turn out. I wanted a rifle for general shooting in our eastern woods and fields—good for everything from crows to black bear, with perhaps chucks and deer the most important. I decided a .25 caliber, 100-grain bullet driven at 2,900 foot-seconds would suit me for deer. For crows and chucks I wanted a fast bullet with flat trajectory and good accuracy. The eighty-seven-grain bullet would do here fine. This rifle had to fit and feel like my shotgun and it must be able to shoot where I look, as a good game gun should. The weight limit I placed at seven and one-half pounds with sighting equipment and sling. Lastly, it must have graceful and beautiful lines so I wouldn't get tired of looking at it in the gun case.

After considering all these facts, I concluded that the .250 Savage would do the job. It uses bullet weights to fit my requirements with good accuracy and speed. I had a Mauser action I could use after considerable overhauling, a nice fancy walnut blank, a beautifully checkered butt plate, and a pistol grip cap with trap that was originally on the finest Gibbs Farquharson I have ever seen. With these parts I was pretty well set. To get the rifle down to seven and one-half pounds and have it handle fast, a short barrel was indicated, so I decided on a Mannlicher type with a twenty-inch barrel.



Caliber .257, with a well-balanced Mannlicher stock: this is the author's idea of an all-around sporter.

With the eighty-seven-grain bullet traveling at 3,200 foot-seconds and the 100-grain about 2,900 foot-seconds, I was pretty well equipped for most of my shooting.

Up to this time no thought had been given to anything except the .250 Savage caliber. But then I got to thinking that to drive these bullets at top speed in the .250, breech pressure runs around 50,000 pounds per square inch. In the larger capacity .257 Roberts case, I could drive these same bullets at the same speed with lower pressure. Any time I can get the performance I want with less breech pressure I'm going to have it. So I chambered for the .257 instead of the .250. With the barrel ordered I started to work.

I like to make a full-size sketch of the job and to let it hang in the shop some time before I actually get started on it. I have found that by having such a picture before me for a little while I can make many changes in the design—all small, but very important in the finished job. I have also found it much easier to erase pencil lines than it is to put back wood or steel once too much has been removed. Since it is to be a full-length stock, let's take the little Mannlicher and see what we like and do not like about it. To me this stock is too thin in some places and too thick in others. I like the dimensions of the muzzle cap. If the combined depth of the ramp and hood, plus the barrel and stock are too deep, a rifle of this type will look thick and ugly regardless of how well designed the rest of the arm may be. The action of the Mannlicher is too deep and looks clumsy, also, and the combination of the comparatively small cap and the deep action makes the line "belly" between the two. This to me, at least, spoils the stock. The cheekpiece is poorly shaped and skimpy. The pistol grip is nearly useless. It gives no support to the hand, being too far back and much too narrow. With all of these things in mind, we get to the drawing.

Since the muzzle of the Mannlicher is what we want, suppose we draw this on the paper. To get a true outline of the design, all sketches must be true to size. The completed drawing will be exactly the same as one side of the gun will look. Since the muzzle cap is what we want, suppose we start by drawing this.

After the cap sketch is finished, draw in the top line of barrel and action. Then, figure the drop from the line of sight to the comb and heel and draw in this line. Next, determine exactly where the bottom edge of the grip will come. The top line of the grip is pretty well set by the rear of the receiver but the bottom edge right at the rear guard screw is sketched in with no regard to the magazine or guard. You cannot get the lines wanted with these parts in their original positions. So, forget the guard and magazine entirely. Now, we can draw two straight lines, one from the rear guard screw to the muzzle cap and the other from the rear guard screw to the toe of the stock. Generally, the gun will look better for every straight line it has and worse for every line that bellies. The depth of the grip from receiver tang to the guard on the military Mauser was a little more than I like. This was drawn in one-eighth-inch narrower. After the drop at heel is set on the sketch, then the tip of the toe will come below this the same measurement as the length of the butt plate which on this rifle was five and one-quarter inches. Draw in the butt plate on the correct pitch angle; then the line from the toe to rear guard screw should be drawn in with a ruler. The curve of the pistol grip is more or less predetermined by the length of the cap, as the

A Mauser action, a walnut blank, a man's idea for an all-around gun . . . combined with the necessary know-how, the result is: Satisfaction

base line from rear guard screw to toe is immovable for good design. The cap I had was about the right size for this stock. It was drawn in with a neat full curve to the guard screw in spite of the fact that it was placing the grip too far back to support the hand with the trigger in the original position.

Up to this point the sketch has been made just the way we think it looks best. These lines are only changed after every conceivable trick has failed to show any way to keep the lines and still not sacrifice anything of a practical nature. The pictures will show how the cheekpiece was shaped and other details which we haven't room here to explain.

Now comes the job of building the rifle as drawn in the sketch. The action will need most of the work so we'll start there. With the guard screwed up against the receiver and laid on the drawing, it was apparent that many changes were needed. The magazine had to be cut off until its bottom edge corresponded to the straight line which was drawn from rear guard screw to the muzzle cap. After narrowing the depth of the action, the guard screws bottomed in the holes in the receiver and had to be threaded further up and then cut to the shorter length. We still have too much length from the grip to the trigger. The preliminary pull of the military trigger was removed by making an adjustable plate which sat in the guard in front of the trigger. This plate has a slit through which a screw passes. This screw is threaded into the guard. By loosening the screw, the plate can be moved back against the trigger. Using this method and by grinding enough metal from the top of the trigger, a good pull is secured and, at the same time, the trigger is being worked to the rear of the bow. I also ground the trigger to finer lines and made the front surface flat. I prefer it flat where it contacts the finger instead of round as it was originally. Since we could not keep the graceful curve to the grip and bring it close enough to the trigger for good support, we just beat the devil around the bush by bringing the trigger back to the grip. The bolt looks pretty bad sticking out straight from the action. The knob is too big and I wanted the bolt close to the stock similar to the Mannlicher. The handle is too long when it is bent down as close as I wanted it, so I cut the bolt handle off entirely close to the bolt. Then, I did the same thing to an old Springfield bolt which has a smaller knob. The Springfield bolt handle was welded to the Mauser bolt at the angle and length desired. The underside of the knob was cut flat on a line with the underside of the handle. This made it possible to easily get a finger under the knob even with the bolt close to the stock.

The guard bow was reshaped similar to a shotgun guard. It looks much better than the original heavy bow. I also made the floor plate as thin as possible as I object to the break this makes in the lower stock line. The complete action was then refinished, removing all pit marks and stampings as well as the name of the arsenal of manufacture. Then, the front receiver ring and the underside of the bolt knob were matted. The front edge of this ring was rounded to give it a graceful line as it drops to barrel diameter. Finally, the action was given a good smoothing up and the magazine spring tension was relieved a little to keep it from causing any more friction than necessary against the bolt. I also shortened the mainspring somewhat as I prefer a smooth action to the little gained in firing pin time by the tightly compressed spring.

This is as good a time as any to fit the Lyman 48 sight. When the front sight ramp has to be made for any particular job and does not need any consideration when fitting the rear sight, it is best to get it as low as possible. As usual, the drop to comb must be low enough to clear the cocking piece. On this job the rear receiver ring was lowered some and made flat on top. The underside of the Lyman staff was also filed to allow this to take a little lower position. Otherwise, the sight was fitted in the usual way. On this flat which was filed on the receiver ring, I drilled and tapped for a scope block. This block had to be specially made because the holes in the standard blocks are too far apart to mount in this spot. The block overhangs the ring in front but not enough to cause any trouble. A standard front block was fitted to the barrel as I wanted to use a 5-A scope for chucks.

To keep the line of sight as low as possible, it is best to get the height of the front sight by shooting the rifle at the range of one hundred yards. With the barrel fitted and the rear sight set about five clicks above the bottoming position, sweat on a small piece of thin metal. This is to temporarily take the place of the ramp and front sight. Be sure this front sight is too high before you get to the range. The idea is to shoot the rifle and file down the temporary sight until the point of impact is where you want it. Windage is not important as we are only getting the proper height for our permanent front ramp and sight. It is best to do this shooting with the load that is likely to have the lowest point of impact. That probably will be the heaviest bullet with the slowest velocity with which we intend to use it. After the shooting and filing, it is easy to figure the size of the ramp and sight. When fitting the finished ramp, the hood should not extend beyond the muzzle. It looks best back about one-quarter inch.

That takes care of most of the changes that were made outside of the regular stocking and finishing. Small diamond inlays of black linen bakelite were inletted under the seven-eighths-inch swivels. This linen bakelite is the best material I have found where pressure is applied such as under the swivels. It just refuses to crack under strain and finishes up to a nice black color. It is also well adapted to butt plates but very hard and tough to shape.

So, there's my rifle—just what I started out to get. I think it crowds pretty closely to that mythical all-around gun. Of course, a heavier rifle would be better for serious vermin work. I am partial to heavy barrels when the rifle is to be used for any long-range work where accuracy either makes a rifle good or useless. But this gun will do for chucks up to 250 yards. It is better adapted to deer hunting than to vermin. But then, this type rifle can never be perfect in all the fields it is expected to cover.

The rifle balances, feels, and points like my shotgun. It has a drop of one and one-half inches at comb and two and one-half inches at heel; it is light and short which makes it easy to carry on long tramps. The magazine holds four cartridges instead of five which to me is not a handicap. And, if it doesn't kill what I shoot at up to 250 yards, it won't be the fault of the rifle. Every major line of the stock is straight and the short magazine does away with the slab-sided look most military actions give to a sporter. The pistol grip is far enough back not to look stumpy, yet the trigger lies nicely in the first joint of my finger. The rifle is easy to carry to the shot, will kill cleanly once it is there, and during the long winter months when there is not much shooting to be done, it will be a nice gun to handle and to look at. ♦ ♦ ♦

"WIND DOPES"

By EDWARDS BROWN, JR.

Wet behind the ears for a fishtail wind.

SPRING CAME TO TOWN EARLY THIS YEAR, and as I was digging away in the garden the other day I smelled, with a touch of nostalgia, that same close-to-nature, earthy smell a guy gets when he plops down prone on a sod firing point for a try at that spring championship. I got to thinking about my favorite sport . . . of the good fellowship of the range blended with the fresh odors of earth, cleaning solvent, gun oil, and well-rubbed stocks. My mind went back to matches at Camp Ritchie, Lafayette, Rockford, Springfield, Chicago, Jefferson City, Camp Perry.

A little puff of wind breezed by and I estimated its velocity. Wind doping again. I wondered how many of the new shooters entering competition this spring will be as mystified by the wind problem as I was when I first took up the sport. I recalled the first competition I ever attended at the Glendale Rifle Club range just outside of St. Louis when, it seemed to me, everyone was overly concerned about the wind throwing out their shots. As far as I could see it was only a gentle summer breeze, hardly perceptible at times. Besides, I had studied a little about ballistics and knew better than to think that the wind could bother my bullets much. But I dropped too many points in that match.

Well, others seemed to get away with that weak, wind alibi, so I figured I might as well be stylish and adopt it, too. Whenever a wild shot appeared on my target I would dismiss it with: "The wind caught me." And that seemed to settle it. Then, to my amazement, some of my wide shots *did* seem to occur with a puff of wind and in the appropriate direction, too. I suddenly realized that "wind dopes" were not quite the same as ordinary dopes.

With my eyes now opened, I experimented. I found that light summer breezes made those shots move to the left, right, up, or down, according to the direction of the wind and the nature of the surrounding terrain. Here was a new sporting element injected into the small-bore game for me.

It's been done—ping pong ball on a string.

The wind problems on the rifle range are similar to those experienced in sailboat racing when you also try to anticipate any changes in wind direction and intensity by studying the shore line and watching distant flags, trees, et cetera, which will indicate such changes. By so doing, you may be able to tack at a time which will give you an advantage over your competitor when the change in conditions actually does arrive.

Wind doping in rifle shooting differs primarily in two ways from wind doping in sailing. In rifle shooting you are always stationary in relation to the terrain and you have the opportunity of "waiting out" changing puffs of wind between shots while losing only time. In Slow-Fire prone shooting there is ample time, the loss of which costs you nothing so long as you don't overdo the thing and fail to get off a couple of your shots.

I set about to determine just how "wind dopes" operate on the rifle range and discovered a strange assortment of tricks. There would be a fellow plucking blades of grass and throwing them into the air to observe their flight. Another would have a light thread fastened to his front sight which acted as a wind sock. The chap down the line would be following puffs of smoke from a cigarette or pipe. There are some who can keep one eye on the target and the other on the range flags. Others prefer watching the grass between the firing point and the target. A very prominent small-bore coach appeared on the range at Camp Perry one year with a ping-pong ball suspended on a string fastened to an inverted L-shaped frame. This indicated very effectively light wind changes.

Until the last couple of years at Perry, there were a lot of shooters using cartridges loaded with Lesmok powder. This resulted in a puff of smoke from every shot. Even if you didn't see the puff you couldn't help but smell it if the wind was right.

Another trick, on a hot day, is watching the direction and speed of the heat waves (mirage). Under some conditions, these can be picked up with the naked eye. But there seldom is any trouble, after a little practice, in picking them up with a spotting scope and determining whether they are running from the left or from the right. Some prefer having their spotting scope slightly out of focus to aid in seeing the heat waves. Wind changes under some conditions can come so fast, however, that before a fellow can get his eye away from the spotting scope and squeeze off a shot the dope is no good. Of course, in an any-sight match using a sighting scope, the problem is simplified because the heat waves or grass can be seen while squeezing the trigger. Heat-wave dope is one of the best at the particular instant it is observed because it seems to indicate the average wind condition over the entire range. Heat waves, or mirage, have an evil effect, however, in that they contort the bull's-eye and make it appear egg-shaped. The illusionary black

is on the side away from the wind which only displaces your shot further in the direction in which the wind blows. It works against you rather than compensates for the wind.

The wind most difficult to cope with is the light "fishtail" wind which comes in over your back and blows almost straight down the range, switching from a few degrees to the left to a few degrees right and vice versa. About the same condition exists for a 1 to 2 o'clock wind which blows into your face. These winds may be so faint that it is difficult to detect them by any of the above-mentioned methods, and this is what makes it all the more tricky. I have even seen shooters wet the tips of their ears so they could feel better a switch from one side to the other. These "fishtail winds" were common at Camp Perry. It always seemed to me that they could be expected around late morning and early afternoon.

Theoretically, a twelve o'clock wind will make your shots go low; a tail wind will make the shots strike high. Don't depend on this, however. Don't try to arbitrarily allow for elevation until you know the particular rifle range on which you are firing. Here is where the terrain enters the picture and you may get fooled.

There are two fundamental methods of applying wind dope. One way is to make allowance for a change by adjusting your sights, or "holding off." Another way is to wait out the change until conditions return to where you know exactly how to cope with them . . . and then pour 'em in fast. The latter method has its disadvantages because while you are waiting, your barrel is cooling. Most shooters prefer to keep the lead coming through at reasonably regular intervals. There is also such a thing as the wind not changing fast enough or so erratically that you cannot settle on any standard condition. In this case, you'd better try a combination of both systems and try to wait out some of the extremes. At the beginning of a match I prefer to adjust my sights for what appears to be the average wind condition. When firing my record shots I would then "hold off" for changes if I was using a scope sight. I do not hold off with iron sights unless allowing for small, rapid changes in wind. I believe that most shooters allow for major wind changes by making adjustments on iron sights. At any rate, don't try holding off with iron sights in a match until you have experimented with this technique on your home range.

I have sat back of the firing line and watched some of the topnotchers such as Rans Triggs, our most recent National Small-bore Champion, Thurman Randle, Bill Woodring, and Dave Carlson shoot in troublesome winds. You may not even be aware of the fact that they are doping wind, but if you don't think so watch them in a two-man team match. The member doing the coaching probably will be calling the dope to the shooting member so fast that he sounds like a tobacco auctioneer. These seasoned shooters, through long experience, can integrate a lot of factors in their minds at once and come pretty close. It's not mathematics, however, but judgment.

On a 100-yard range I have seen the wind momentarily blow one way at the target and the opposite way at the firing line. This condition may not last long but, then, it doesn't take long to get a bullet down the range either. This brings up the old argument as to whether the wind at the firing line or the wind at the target has the most effect. If a cross component of velocity is imparted to the bullet early in its flight, that component will naturally act over a greater period of time than one which is imparted near the target. You can't get away from the fact that velocity times time equals distance. Therefore, for short ranges, my argument is that if you were to apply two equal winds, one over the first half of the range blowing towards the right and one over the last half blowing towards the left, the bullet would move toward the right on the target.

Here are a few suggestions which helped me along in this wind doping business . . . and which may help you:

After firing a few targets on calm days, determine the zero windage reading on your windage scale. Record this. Then, learn to judge your wind and find out how much you have to allow for various conditions. This helps develop your wind judgment.

Use the clock system of determining wind direction. Imagine yourself lying in the prone position in the center of the face of a clock. You will then be facing twelve o'clock. A wind from the right hitting you squarely on the right cheek will be a three o'clock wind, et cetera.

Then, learn what different wind velocities feel like and look like. A wind velocity of two or three miles per hour is hardly perceptible and only the most sensitive tests can detect it. A five-mile-per-hour wind enters the gentle breeze class and can be felt on the face. Leaves begin to have slight motion and flags flutter. When the wind reaches ten miles per hour tall grass is waving, leaves are constantly rustling, and flags are waving. A wind of this velocity is commonly termed "fresh." At fifteen miles per hour dust will blow, grass will be moving violently, small branches will bend, and flags will be well extended. When the wind hits twenty miles per hour, put extra fasteners on the targets and adjust your chin strap. ♦ ♦ ♦

WIND DOPING FORMULAS

Following are six simple wind formulas for horizontal deflection, three for the caliber .22 at target ammunition velocities and three for the caliber .30-'06, ball M2 (152-grain bullet) at a muzzle velocity of 2,750 feet per second. There will be differences for various makes and velocities, but these rules should serve as a general guide. R = Range in yards; V = Wind velocity in miles per hour, and D = Horizontal deflection in minutes of angle.

Cal. .22 Target Ammunition

3 and 9 o'clock winds	2, 4, 8, and 10 o'clock winds	1, 5, 7, and 11 o'clock winds
$D = \frac{R \times V}{250}$	$D = \frac{R \times V}{300}$	$D = \frac{R \times V}{500}$

Cal. .30-'06 Ball M2 (152 gr.)

$D = \frac{R \times V}{1000}$	$D = \frac{R \times V}{1200}$	$D = \frac{R \times V}{2000}$

The Very Good Krag .30-40

By BILL McCANDLASS

WE WERE SHOOTING THE BREEZE in the barbershop and had reminiscent deer spread out all over the place. The fellow next to me, looking over a magazine, was a stranger. But he was interested in all the hunting talk and presently he put in his two-bits' worth about an experience he had when after mule deer. You could tell by the way he talked that he had really been there, so pretty soon I put that inevitable question to him that all good gun nuts and hunters get around to eventually. I asked him what gun he used for his deer hunting. He seemed almost embarrassed when he said, "Oh, I just got an old Krag. But I manage to get my deer with it."

I didn't know him well enough to tell him that he needn't act so apologetic about it. But I felt like it. For no man who carries a Krag .30-40 into the game fields needs to apologize for that fine old weapon. For the Krag .30-40 is one of the very good guns and cartridges of all time.

To begin with, it is the smoothest-operating bolt gun ever made by anyone, anywhere. The .30-40 cartridge is one of the most efficient ever designed. It is a grand case for the man who likes to reload, and anyone with a reasonably decent set of reloading tools and molds can get anything he wants out of it—from a rat killer to a moose stopper. I have seen .30-.40 reloads that were so light the report seemed hardly above the snapping of the primer; yet they were surprisingly accurate at short range. And from there a man can go right on up the line to the big basher, the 220-grain bullet at a trifle above 2,000 feet muzzle velocity. For the guy who drools at the jowls when you speak of penetration, this load is IT! In full jacket it is right around five feet in pine. I said *feet*, not inches. And in between these extremes are any number of pleasant and useful loads.

Once I was a bloated plutocrat as far as possession of Krag rifles was concerned. I had six or eight of them. But one by one they got away from me. I'd feel sorry for some impecunious friend and make him a present of one, or I'd let some slick-tongued gent talk me into selling him one, and the first thing I knew Old Man McCandlass ended up without a Krag to his name. In consequence, I have more than once given McCandlass a durned good booting around for being such a lop-eared sap.

I had a lot of fun with some of those Krags. Three in particular. Two of them had been cut down to twenty-two-inch barrel jobs, the other to twenty-four inches. One of the shorter lengths I used for deer and never could find the slightest fault with its killing power. The other short-length gun I had sighted in for a load consisting of a 120-grain cast bullet ahead of eleven grains of No. 80 powder. This was really my fun gun. With a double pocketful of those hulls I spent many a pleasant hour browsing through the foothills. It would pick a blue jay out of the tallest oak as slick as you please. Digger squirrels and jack rabbits more or less came unhinged when I'd peck 'em reasonably close to center. And when the pooch would strike the trail of a house cat gone wild and put it up a tree, why right then and there I'd do my good deed for the day as far as the quail coveys were concerned. Many a pound of lead I spread around the hillsides through the medium of that load, and I can't ever recall more pleasant shooting with any gun I ever owned, before or since.

The twenty-four-inch barrel job was another pet. This gun came to my hands brand new, the barrel perfect, apparently never having been fired, aside from the original test loads at the arsenal. I started right out with new, primed cases, and cast-bullet loads in this Krag. A handloading friend of mine, an exceedingly capable and careful workman, was using the Pope cast bullet in his Springfield for turkey shooting at one hundred yards. The load was an exquisitely accurate one, and the local turkey-shooting gentry, after tangling with it a few times, virtually refused to shoot against it.

One day he suggested trying a comparable load in the Krag. He selected the Squibb-Miller bullet, 170 grains in weight and approximately eleven grains of No. 80. The bullet, lubricated and sized, was set into the case with the fingers, hardly tight enough to remain there. Because of the over-all length of the load it was necessary to use the rifle as a single shot.

Well, I went out and sighted in at one hundred yards. Then, shooting prone, with sling, I fired a ten-shot string. I got nine good letoffs and one not too good. The target used was the standard 100-yard small-bore bull. Of the nine good letoffs, every shot was clean inside the ten-ring, just chewing the center right out of that target. The other shot was all it deserved on the not-so-good letoff, a close nine. I have often thought since that I would have liked a chance to try that gun and load with the ten-power Fecker scope that adorns the heavy-barreled Model 52 small-bore target gun. I'm convinced that load would have come so close to shooting into the same hole at 100 yards it might have shocked the natives. The load let off with a clean, sweet crack and the bullet cut a perfectly clean-edged hole in the paper. Did I win turks with it? You bet I did.

Mattern listed a whole slew of .30-40 loads and all of them good. There are several gas-check loads that can be cooked up in the .30-40 which, in the hands of a reasonably good shot, will kill deer like nobody's business. They have the accuracy and punch to do the job very nicely. They shoot beautifully clean and Man, oh, Man—what a gorgeous polish those cast bullet loads put on the bore of a rifle!

Many years ago I remember reading in one of the outdoor magazines a piece by that fine old-timer, Ashley Haines. He was discussing what gun and caliber he would select if he were setting out on a long, long sojourn in the back country where he would be faced with the necessity of making one gun do all the shooting jobs that might come up, from picking up grouse and squirrels, rabbits and ducks, and such small fry for the eating pot, on up to necessary venison and perhaps a moose or two for the winter store of meat. Also, included was a squib load for use along the trap line. As memory recalls, Haines said he'd select the .32 Winchester Special.

It was a good article, highly interesting and thought-provoking. I have thought of it many times since and always

with one change. If I were making such a trip, the gun I'd end up by selecting is the .30-40 in the Krag rifle. I'd have just three loads. I'd have the 120-grain cast-bullet squib load. I'd have another using a cast gas-check bullet of about 170 grains, hustled along as fast as practical accuracy would allow, for deer and suchlike. And then I'd throw a couple of boxes of factory 220-grain soft-point loads into the outfit for any real heavy stuff I might run across. By judicious selection the reloading equipment and components could be kept down to a reasonable amount of weight and bulk, and with that good old sound and reliable Krag rifle to handle the finished product, I wouldn't have to ask favors of anyone.

Get me right, the Krag and the .30-40 cartridge won't give you the flat shooting and extreme long-range hunting accuracy and punch that a .270 Winchester will. It won't dish out as powerful killing loads as the Springfield will handle. It won't give you the compact handiness and lightness for squib work as will a .22 Long Rifle. But it will offer an all-around approach that is mighty hard to beat.

There are some who object to the magazine of a Krag, saying it interferes with comfortable carrying of the gun. I never found it so and it is a small point to quibble about anyway. It is definitely a sure and reliable magazine action and the easiest and fastest I know of for loading or unloading. You just pour 'em in or pour 'em out. Maybe loading by clip in other bolt-model guns might be a trifle faster, but then again I'm not so sure. And if you have fired a shot and want to sneak in another shell, you don't have to open the bolt to do it.

So I say again, Brother—if you're shooting a Krag, don't you let anybody look down his nose at you. He'll have to go some to have a better gun than yours, or one even as good. ♦ ♦ ♦

White Collar .30-40

By RICHARD H. BARTLETT

FOR SOME TIME NOW the old .30-40 has come in for a lot of comment, both pro and con. It is not my intention to add anything to this age-old discussion except facts which I have discovered through the use of my .30-40.

The kink I wish to describe is a simple one, and one that proved to me, at least, that the accuracy of my .30-40 could be, *and was*, very definitely improved. For several years, my gun was not used because it wasn't as accurate as I like, so to pasture it went. Last summer I took her down and began figuring how accuracy could be instilled in this weapon to a point where I could depend on its being a reliable hunting weapon.

First, she got a new peerless unfinished stock. The military front sight, which I had been using with a Redfield 102K, was discarded and a Stith streamline holding a 330 Weaver took its place. The Weaver has two dots, one for 100 yards, and another for those long shots. The barrel, by the way is and always was, twenty-two inches long.

When it came time to fit the stock, I tried putting the barrel band back on, and luckily, before cutting the forearm to fit, I began wondering if perhaps the barrel band was not the seat of the gun's inaccuracy. What about barrel vibration and barrel float? These things affect accuracy, or more specifically, point of impact. So why use the barrel band at all? Why not drill and tap the forward end of the receiver for another machine screw to be run up through the forearm? At this point, I remembered having run into a hunter in the Blackfoot Valley of Montana who was carrying a .30-40 and who had slipped a piece of pipe over the barrel of his gun and sweated it just forward of the breech. He had done this, he said, to dress up the sharpness and abruptness of the forward breech ending. The pipe had been filed to slope toward the barrel and it did improve the appearance. That was my solution! I got in touch with a machinist friend of mine who made and fitted the collar described here.

The measurements given are taken from my gun and my stock. Allowances will naturally have to be considered for your own particular .30-40 and the stock that you have on it.

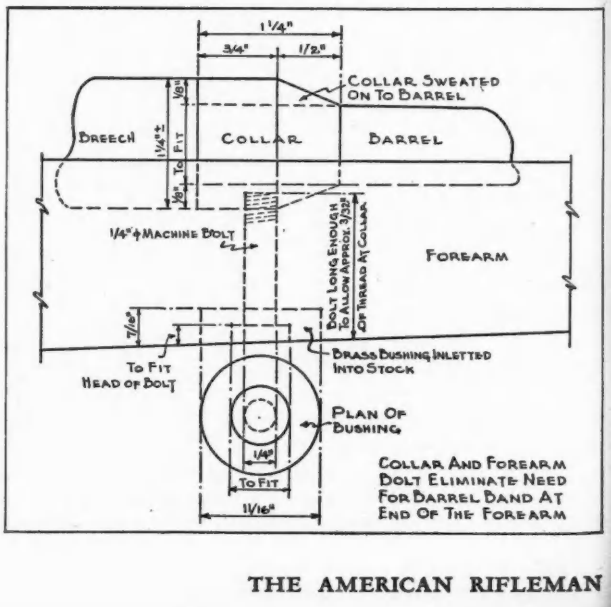
The important thing to me has been the greatly improved accuracy which is due, I am sure, to the fact that the entire barrel is allowed to float for its over-all length. Even if a sling is used, there is no holding action on the barrel, for my sling is attached to the forearm and the barrel is still allowed to vibrate and float freely. Incidentally, I use Western Super-X 180-grain soft points.

The drawing below shows the collar in place, replacing the abrupt step-up from barrel to breech with the better-appearing taper. Note the brass bushing inletted into the bottom of the stock to take the holding pressure of the quarter-inch machine bolt which is threaded into the collar.

Measurements indicated in this illustration are by no means to be accepted as standard. Any or all of them may vary somewhat to conform to materials available.

The stock will have to be inletted, of course, to receive the collar and you may have to work over the barrel channel through the forearm to allow the barrel new clearances.

This collar dresses up your .30-40 and I am sure you will find that it will greatly improve the accuracy of your gun. ♦ ♦ ♦



SCORING WITH EASE

By TOM KIZER

FOR THE PAST FEW YEARS it has been my task to do the scoring for an eight-team, high-school rifle league. I became a victim of poor lighting. Every range had a different lighting arrangement at the scoring table. Now, I'll agree that for the ordinary shot holes any kind of light will do. But for the close ones—the kind that are in or out only by a hairsbreadth—a good light is necessary, particularly if one is to give every shooter the benefit of accurate, positive scoring.

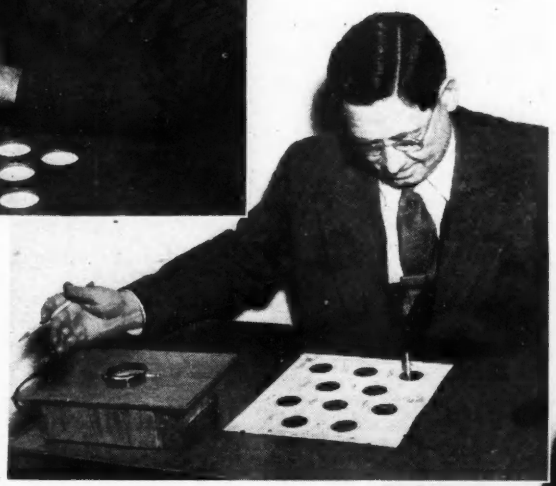
The apparatus illustrated eliminated the light problem and the necessity of handling the target, once scoring is begun. We use the official ten-bull target, A-16. So, I cut ten holes in a piece of plywood on the pattern of the A-16. The holes are a little larger than the five-ring so that, with the target flat on the board, any scoring shot can be plugged. Four small screws act as guides to keep the target properly placed. As they can all watch. The boy who shot the target gets preference and I let him stand beside me while I score his target. When we come to a close one, I use the light box and then let him look at it. The apparatus convinces him that he is getting a fair shake, and when he admits that what looked like a ten just touching, is, in reality, a nine he has no ground for a protest later.

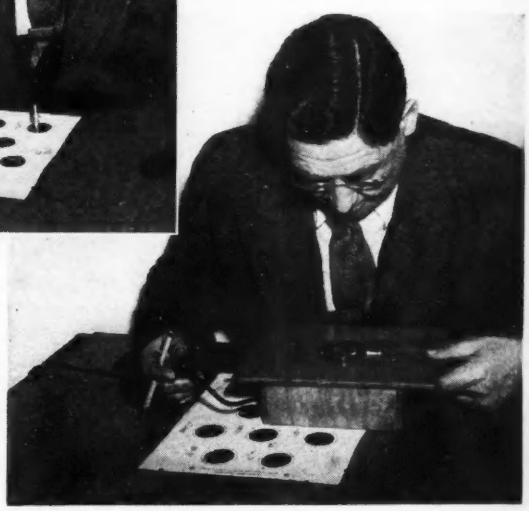
The dimensions of the board and box can be seen from the photographs. The "belly hole" in the board can be omitted by the "skinny fellers." The lights are two medium-size showcase lamps, 110 volt, 25 watt, wired in parallel.

I exposed this apparatus to public view for the first time at the annual Lincoln's Day tournament sponsored by the *Long Island Daily Press*, Jamaica, New York, and held at the Armory of Fourth Regiment, New York National Guard, Jamaica—open to high-school boys in the Metropolitan area. The outfit was a sensation; no one in these parts had ever seen or heard of one before and all were enthusiastic about it. It was so well received I began to think that I had hit on something new.

It serves two purposes for me. It is speedy, no small factor when one has hundreds of shots to call. It insures each boy in the league a fair break inasmuch as all close ones are scanned under the same conditions. And it enables the shooter to see the close one in exactly the same way the scorer does. I have yet to find a boy who could disagree once he had viewed the shot through this box. It leaves no room for doubt.

The photos tell the whole story. One shows the board and the interior of the box. Another shows the target in place being scored, the gauge inserted in a close one and the scorer reaching for the box. In the third, he has snapped on the light, and is scrutinizing the shot. ♦ ♦ ♦





I do not ever write in the scoring area, I can score and mark the value of each shot. The holes in the board do not interfere with writing.

When it is necessary to scan a close one with a magnifying glass, I place the light box over the plugged shot hole and snap on the lights. The magnifying glass, fixed into the top of the box, is focused just right; a glance at the gauge, through the glass, quickly convinces. I am independent of the lighting arrangements because I have my own light which is always the same.

Some scorers object to having the shooters crowd around while the scoring is going on. I do not. As long as they do not push me away from the table,

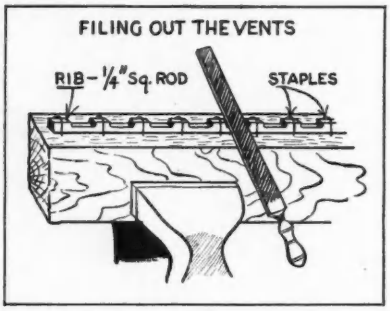
Upper Left: Box with magnifying glass and show case lamps set in top. Note holes cut in scoring board which correspond to the NRA ten-bull target and permit (Above) gauge a to be set in the shot hole without lifting paper. Here's a close one now so . . . Right: Set the box over the bull, switch on the light, and you've got the answer. This apparatus has proved both fast and accurate.

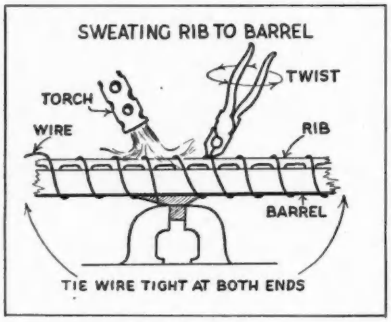
The Home Workshop

By FRANK DE HAAS

A Ventilated Rib for Your Shotgun

IF A PERSON IS USED TO SHOOTING a plain-barreled shotgun, then anything on the muzzle (like a choke device) tends to disturb the aim until he really gets used to it. That is where installing a ventilated rib does some good and useful service. Sure, a rib of this kind is nice on any shotgun, but some need it far more than others. This Remington auto shotgun on which I installed a choke device needed something to straighten the sight line and the illustration shows the result.





A ventilated rib is not nearly as hard to make and install as one is led to believe. Get out your gun catalogues, study some of the illustrations, and try to find a rib that will suit your own gun.

All the material needed is a piece of one-quarter inch square mild steel rod a little longer than the barrel. Any machine shop or blacksmith has it. Cut it to exact length of the barrel and square the ends. Lay this rib on the barrel and mark the metal to be cut off or filed down on one end to conform with the contour of the breech end of the barrel. File this down and fit often to be sure it is right as the rib must remain straight on top and touch the entire barrel on the bottom. Now, you have a solid rib.

Measure and mark with chalk the sections to be cut out to make the bridges of the ventilated portions. To make grinding and filing out these vents a lot easier and to keep the rib straight and true, staple it top side down to a two by four the length of the rib. Drive in the staples where no grinding is needed. With rib in place, grind out most of the metal and finish with a large flat file as illustrated. Final finishing should be done with the rib held in a vise, and at this time get all four sides smooth and square with a file.

With several "C" clamps, clamp the rib to the barrel. Be sure that it is straight and squarely on top. Take time here. Mark around each pillar with a scratch awl or wherever the rib touches the barrel. Then, take off the rib and with a small file and careful work, level out each marked out spot, so that the rib will fit neatly on the barrel. The better the contacting surfaces fit here, the better it will stay on and the better it will look.

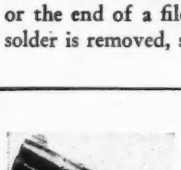
Silver solder in ribbon form would be the very best for the next step, but plain solder will work fine if used right. Tin the rib and barrel where they come in contact with each other. Use baling wire or other similar wire about one-eighth inch thick and wire the rib to the barrel, making a loop, or looping once around over each pillar. Fasten the wire securely at each end. Now, see that everything is square and true before any more work is done. When satisfied, light up the torch. As the barrel is heated and the solder melts, take a plier and twist each wire loop on top of the rib to force the rib tightly against the barrel. Go over it twice this way making certain every joint is stuck fast and that the rib goes on straight. When done, let the barrel cool slowly.

When cool, unwrap the wire and begin removing the excess solder that has been pressed out between the joints. Use a knife or the end of a file. Don't scratch the barrel though. When solder is removed, start polishing with emery cloth. ♦ ♦ ♦

A SNUB-NOSED .38 SPECIAL

Illustration shows a Colt Police Positive in .38 Special caliber that was "snub-nosed" by utilizing the cut-off length of barrel, with original sight attached.

The four-inch barrel was cut just ahead of the ejector rod head, leaving a two-inch barrel on the revolver. The front sight and rib was cut from the two inches that was sawed off. This was done with a hack saw, with the section of barrel held in a vise. Dress down the rib with a file till about one-quarter inch wide. Now, file the top of the snub-nosed barrel flat the width



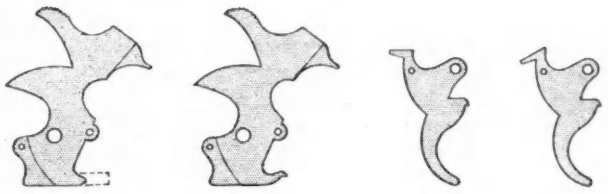
of the rib, and then carefully fit the rib and barrel together, filing the underside of the rib so that no light will show between. Tin the two contacting surfaces of rib and barrel. Before sweating, sighting-in will be necessary. To do this, wire the rib with sight in place. When correctly sighted, clamp the barrel in a small vise, wire and all, and apply the flame of a blowtorch to sweat the rib in place. Polish and square the muzzle, scrape off the excess solder, and then dunk in the blueing tank. ♦ ♦ ♦

SHORT ACTION REVOLVERS

By BILL KIRSH

A CONSIDERABLE NUMBER of short-action installations on both Colt and Smith & Wesson revolvers during the past ten years have brought reports from shooters of improved scores which are more than gratifying to a gunsmith. The greatest gains are shown, of course, in Rapid-Fire since the short action enables the shooter to recock his gun without moving the sights out of line with the target. For Smith & Wesson revolvers especially, this will be a great improvement, although I believe the new S&W's will come from the factory with the short action already installed.

The accompanying sketches show how an amateur gunsmith can change a revolver to the short-cocking stroke without destroying the possibility of replacing the original action. If you carefully follow the instructions you should not run into any difficulty. However, before tackling the job remove the inspection plate and thoroughly familiarize yourself with the action and its synchronization so that you will understand how the altered parts are to work when reassembling begins.



Let's suppose it is a Colt you wish to alter. First, weld the hammer as shown in Figure 1 using a welding rod of high-carbon content, such as a drill rod. I have found that spring wire is very good. Let the part cool slowly so as not to air-harden by placing it in lime or sand. When it has cooled, reshape as shown in Figure 2. Next, heat the trigger, Figure 3, to a bright red and bend down the sear projection one-sixteenth of an inch from its original position as shown in Figure 4.

Now comes the assembling of the rebound lever and the hand. Assemble all parts, leaving the cylinder out of the gun, and by carefully working and studying the action you will see where to refit the rebound lever so that the cylinder stop, or bolt, functions correctly. When this has been accomplished and all the parts are synchronizing, check the trigger pull. This may be adjusted to preference by changing the angle in the hammer notch.

Install the cylinder and fit the hand so that the cylinder is in time—that is, when the hammer is in the cocked position the cylinder is locked also. When all parts are fitted and the action is working to your satisfaction, the hammer and trigger must be hardened and retempered. Heat to a dull red where the changes have been made and submerge in clean water. Polish to a bright finish, heat to a dark straw color and again submerge in water.

For the Smith & Wesson, the trigger is not altered as in the case of the Colt. Weld the hammer with low-carbon-content rod and reshape as shown in Figure 2. In reassembling the parts you will find that the only part to refit is the cylinder stop. When the action is working to your satisfaction, check the trigger pull. If it isn't right, change the angle of the hammer notch—more angle to lighten the pull, less angle to make it heavier.

To reharden the welded hammer, heat to a bright red and caseharden in cyanide or any other brand of heat-treating salts. The final step is to install the hammer stop. This can be done inside the frame where it will not be seen. Cock the hammer to the shortened position and at this point drill a small hole in the frame part way through. Insert a small pin of the proper length to stop any further hammer movement when it is cocked to the short position.

I do not suggest that anyone can do this conversion who has not had considerable experience in gun remodeling and in use of a welding torch. Outside of the welding, the change-over is all hand work and one must be an expert with a file to accomplish the short action successfully. ♦ ♦ ♦

TINKERIN' NOTES

IF YOU WANT TO MAKE a pair of quick detachable dust caps for your hunting scope, don't throw away the poor old inner tubes that have been carrying the old jalopy all during the "duration." Look them over and select a piece that hasn't been worn down too much by the wear, about five inches wide and an inch or so shorter than the scope. Take it from the periphery of the inner tube—the part that has been running all this time on the ground. It will have a sort of a bend in it—maybe even a patch or two—but that's O.K. Fold it lengthwise and then just cement the ends together. Be sure and get them well fastened. Now you have what, with a little imagination, looks something like a boat. Worry a hole through one end of this boat for a lanyard about a foot long.

All you do is set this "boat" downside up over the front end of the scope, haul back on the other end, and pull it down over the ocular lens. Tie the lanyard to the scope mount so that the "boat" is properly moored and can't drift away with the tide. This keeps the lenses free of dust and is handy in foul weather. When you have to go to work in a hurry, just give the rear end a yank and let her snap off the front and drop out of the way.

* * *

That high polish looks beautiful on a fine rifle after blueing with one of these new salt solutions. But that beautiful blue doesn't hold up so long. Seems like a surface that has been polished slick and smooth *without* that high gloss holds it better. Guess the high polish doesn't leave enough hollows in the pores of the steel to let the blue take hold. I'll get along without the high gloss.—AL MARCIANTE. ♦ ♦ ♦

IMPROVING YOUR SCORE

Handgunners—Attention! Beginner or old-timer, for the big outdoor competitive season ahead here are some pointers on how to add points to your score . . . condensed from an earlier Rifleman article by the NRA's Frank Wyman—Part One

IT CAN BE DONE. Beginner or Expert, there is room for improvement in most of our scores. But this is directed primarily to the newcomer to our game, so let's look at a few things the topnotchers do that aren't done by the boys farther down the bulletin. The shooter who is already scoring from 265 to 270 must look for any additional points through close attention to all the small details of his own individual shooting. No one change can be expected to suddenly run a 265 average up to 275 or 280. The new shooter, on the other hand, should learn all angles of the game right from the beginning. To do so will eliminate numerous false starts and much lost time.

High-power rifle shooters keep careful records of each shot fired—weather conditions, wind, light, temperature, et cetera. Such elaborate "dope" is unnecessary for pistol shooters—our ranges are short, and wind affects the shooter more than it does the bullet. But you *should* keep a record of all practice and tournament scores. If you use more than one gun, keep a *complete* record on each of them.

Your record should show every score at each stage, the date fired, and the ammunition used. Thus, you know what ammunition gives you best *average* score, and just where you are weakest. Figure your *average* score every three or four weeks, and then practice where your scores show you need it the most.

When the old-timers first began competing in matches over the National Match Course, they found that the skilled Rapid-Fire shooter almost invariably won. Thereby was born the saying, "It's the Rapid that separates the men from the boys." This may have been true a few years ago when winning three-stage-course scores were lower than they are now, but the wise shooter today is the one who realizes that he can pick up a few points at Slow-Fire if he'll practice diligently. Check over some old National Match Course bulletins—any caliber. See for yourself how many competitors in the 240 to 270 class are way down in their Slow-Fire scores. If your shooting averages from ninety-one to ninety-five Rapid, you have only from five to nine points that you can hope to pick up, whereas, with an eighty average Slow Fire, you are playing with a possible twenty points.

All right—let's suppose you are averaging from eighty to eighty-five Slow Fire and would like to boost that a few points.

The matter of special stocks is receiving a lot of attention—and rightly so. No shooter can do his best with a gun that doesn't fit him. A handgun to be used over the three-stage course of fire requires a different stock than that of a strictly Slow-Fire gun; therefore, be conservative in remodeling stocks—particularly in respect to revolvers. Don't equip your three-stage gun with too large a stock. See that the stock does not crowd your hand uncomfortably. Finger grooves are all right, but space them to fit *your* hand.

You may think you are taking the best possible stance, and holding the gun so that everything is just right, but—do your shots have a tendency to go in any one direction? You "call" where they *are* all right, but they almost invariably go out in the same direction! It may be either foot position or grip that is at fault. If they vary high or low at 2, 5, or 10 o'clock, it is probably the fault of your grip. The way to check up is this:

Fire a couple of shots—slow, of course, using your usual stance and grip. Take your usual rest period, and then extend the gun to your normal aiming position *while you are looking away from the target*. After the arm has been fully extended, look at the sights (never mind whether or not either the front or rear sight is pointing at the bull's-eye), and see if *front and rear sights* are *aligned* properly. If the *front* sight is not correctly *positioned* in the *rear* sight, your grip is wrong and some of your hits out in the white can be attributed to the slight tension you have been unconsciously exerting on wrist muscles to *align* the sights. Shift the gun in your hand until when you make this test the sights are close to being perfectly aligned without any wrist movement at all.

Now, let's check up on your stance, so far as facing the target is concerned. Proceed as you did when checking on your grip. Extend the gun to arm's length toward the target while you look away. Look over the sights and see if the gun is pointed right or left of the bull's-eye. If the gun is not pointing correctly close to the bull's-eye, change your stance to bring the gun to bear properly, and thus save the muscular effort necessary to swing the arm over to align the gun on the bull's-eye. The above checkup for foot position is commonly used by riflemen, but is not used nearly as often as it should be by pistolmen.

On a windy day outdoors, the correct foot stance is different than when shooting on a calm day or in a gallery. In a wind that is blowing across the range, face your target more fully than you do for gallery shooting, and if the wind is very strong, spread your feet farther apart than usual. Either or both of these changes will brace your body against the tendency to sway in a cross wind. By the same token, you can brace yourself against a 6 or 12 o'clock wind by facing at a greater angle *away* from the target.

Speaking of shooting in the wind, it is strange how many competitors never learn to shoot Slow Fire on a windy, gusty range. If your relay catches a gusty, puffy time, don't stand with arm extended, cussing, and fighting the wind. Instead, rest yourself during the gust, and when you feel the wind begin to die down, get ready to shoot—*and fire as many shots as you can* during the lull. Your scores under such a system will not be as good as you can do Slow Fire under *good* conditions, but you can be sure they will be better than if you attempt the usual procedure of a rest after each shot, and then have to fire part of the string, with wind or no wind, to finish in time.

Another practice of rifle shooters when firing offhand might very well be adopted by more pistolmen, and that is to take a camp stool to the firing line, and sit down between shots at Slow Fire and between stages of Timed and Rapid.

If your arm begins to tire don't continue to aim, thinking that you will get the shot off properly anyway. If you do fire under these circumstances you'll jerk in spite of all you can do to avoid it. Take the gun down, and start all over again after you have taken a little rest. (*To be continued*) ◆ ◆ ◆

COMMON SENSE APPLIED TO—

Internal Ballistics

By C. C. MEREDITH

PART TWO

(To sum up the early experiment described last month, it appears that neither altering the shape radically nor increasing the powder capacity by about 18 per cent has altered the burning characteristic of the powder. It has not improved appreciably the pressure/velocity ratio, nor has it increased the muzzle velocity in a ratio out of proportion to the increase in propellant used. The inference is, then, as stated before, that chamber shape does not matter a great deal aside from the question of ease of manufacture and satisfactory functioning in the mechanism of the arm in which the cartridge is used.)

ELEMENTALLY, WE ARE DEALING with a piece of matter, having a certain mass, which we wish to project to a distance. This piece of matter is commonly called a bullet, or to use the more general term, a projectile. Our bullet differs only in form, material, and construction from any other projectile of the same weight, two primitive forms of which are the arrow projected by a bow and a stone thrown by a sling. All three projectiles are propelled by a *definite* force applied for a *definite* period of time, and after they leave the mechanism designed for their projection, all are acted upon by the same retarding and deflecting forces. These forces are gravity, which tends to deflect the projectile downward towards the earth; wind, which tends to deflect it laterally to one side or the other of the line of fire; and air resistance, which resists the forward movement of the projectile, eventually bringing it to a stop unless some more solid body is first hit. These three factors will not be discussed further, as they are the basis of the science of external ballistics and hence are beyond the scope of this study.

Each of our three projectiles receives its entire momentum during the short period of time in which it is under the control of the projecting device. This energy is imparted to the projectile, whether it be bullet, arrow, or stone, by the application of a definite force acting on a finite area (i.e. an area having definable limits), at a certain rate for a small but measurable period of time. The projectile, by its inertia (resistance to movement) resists movement throughout the time during which the force is applied, the resistance being greater at first until the object starts to move after which it gradually decreases during acceleration. In the arrow or stone projectile, inertia and air resistance are the only retarding forces of any consequence; in the case of the rifle ball, in modern arms, there is also "forcement" to be taken care of, which is the resistance offered by the bullet to being forced into the rifling of the barrel. After forcement is overcome, there is the frictional resistance resulting from the pressure of the bullet against the bore and lands of the barrel.

The velocity imparted to any of these three projectiles is governed by a sudden release of energy; the primitive ones being limited by the strength of arm and skill of the shooter, that of the rifle bullet by the amount of energy released by the propellant contained in the cartridge case. Never lose sight of this; there is no black magic or hocus-pocus connected with the propulsion of a rifle bullet: it is the direct result of the expenditure of a known force in a certain period of time against a definite area. The bullet resists movement due to the resistance it encounters, and by its own inertia. The physical laws governing such matters are well known, and not very complex; these laws can be applied alike on any of our three projectiles, to analyze and predict their behavior. Since we are not here interested in the two primitive forms, we will not refer to them further. They were introduced only to provide a means, easily understood, of illustrating the fundamental principles of the motion of projectiles.

It may be well to mention these laws here in detail. There are just three of them, and they can be applied to predict and explain almost every action of a rifle bullet or other projectile from the instant it starts to move until it finishes its flight, from the purely mechanical angle. The famous Isaac Newton postulated them from observing objects in motion, and they are as follows:

First Law: "Every body remains in a state of rest, or of uniform motion in a straight line, unless it is compelled by impressed forces to change that state."

Second Law: "Change of motion is proportional to the impressed force, and takes place in the direction of the straight line in which that force is impressed."

Third Law: "Action and reaction are equal in magnitude and opposite in direction."

These three laws are commonly called "Newton's Laws of Motion," and the thoughtful student will do well to memorize them and apply them in his consideration of what happens to his bullet, from the time it starts to leave the cartridge case until it comes finally to rest at the end of its flight.

The projection of rifle bullets at present high velocities hinges upon the commodity commonly called "gunpowder," and the performance of this substance is an important part of the science of internal ballistics. Gunpowder, as we know it today, is a chemical compound composed largely of the elements carbon, hydrogen, oxygen and nitrogen. Carbon, as everyone knows, will burn if combustion is initiated in the presence of sufficient oxygen; nitrogen is the agitator in the neighborhood, which renders the other elements dissatisfied with each other's presence, making each wish to get at the other's throat on the slightest provocation. The provocation is supplied by the act of firing the primer. As soon as the hat is dropped by firing the primer, carbon and oxygen tear into each other, and in doing so liberate large volumes of gas. The oxidation of the hydrogen content is an even more potent source of energy. Hydrogen combines with oxygen with great violence to form water, which, at the reaction tempera-

ture, is in a gaseous state capable of great expansion. Since this is happening in an enclosed space, a considerable increase in pressure ensues, the pressure increasing until it is large enough to force the bullet into the rifling and up the barrel. Since this pressure is increasing, the speed of the bullet also increases up to the point where the gas expansion stops, in accordance with Newton's First and Second Laws.

The subject of propellants has been studied for a great many years by many exceedingly able scientists, and a great deal is known about the behavior of the different powder compositions under given conditions of use. This knowledge comprises how to compound the constituents in order to produce the most useful chemical reactions; the amount of heat which the primer must supply to successfully initiate this reaction; the temperature attained by the resulting gas under known conditions; the volume of gas and the pressure developed under stated circumstances. It is not intended to infer that nothing more can be learned about the subject, for although modern rifle powders are greatly superior to the original black powder, there is still room for improvement. We do mean, however, that the powders available to the handloader are pretty well understood, and that their performance under most conditions of use can be quite closely predicted.

The principal characteristics are: (a) Energy content, which can be expressed either as "foot-pounds per grain," "calories per gram," or "British Thermal Units per pound." (b) Speed or rate of burning. (c) Burning characteristic.

Item (a) is governed largely by the chemical composition of the powder, (b) and (c) may be determined by either the physical shape of the individual powder pellet, by its composition, or by both. What must be brought out here is that these three basic properties are determined solely by the chemical or physical make-up of the powder itself, and simply cannot be altered at all by the way in which the powder is used. The efficiency with which the energy latent in the powder is utilized is almost entirely dependent upon the pressure at which the powder is forced to burn. The pressure developed for any set of conditions is controlled entirely by the confinement and is therefore a function of loading density. For any particular propellant, the loading density is limited to upper and lower limits set by the "tolerance" of the powder, and usually charges having higher or lower values of Δ will prove unsatisfactory, and when the upper limit is exceeded, positively dangerous.

Summing up, the source of energy available to us for propelling our projectile is a chemical compound which by virtue of its decomposition, will deliver upon demand a definite propelling force, the extent of which is known, as are the conditions under which it will most efficiently deliver this force.

Let us now place a suitable amount of this latent energy in a vessel designed to withstand the pressure it can develop, plus an ample margin of safety. We need this margin of safety, because this energy is going to be altered into "kinetic energy" right suddenly within a few inches of where we have our being; the pressure vessel being none other than the chamber of a rifle. Not only must the chamber and action withstand some 40,000 to 50,000 pounds per square inch, but it must also be capable of withstanding the extremely rapid application of this pressure. To fully appreciate the magnitude of the force involved, it must be realized that if the pressure rise were continued at the same rate for one second, the pressure would reach the astronomical figure of over *100,000 tons*. Think well on this when you are tempted to use a compressed charge in your pet rifle, bearing in mind that the higher the pressure a load develops, the shorter the period of time it takes to reach its maximum. For convenience we place the powder charge in a cartridge case rather than directly into the chamber, the mouth of the case being corked with a bullet. The strength of the cartridge case is small when stacked up against the force it must withstand, and, aside from preventing the escape of gas to the rear, does not add materially to the strength of the pressure vessel. Never lose sight of this point either, and allow yourself to be lulled into a state of false security because you have placed your hot charge into an "extra-strong" case; this may, in fact, only aggravate the condition, since the extra brass in the cartridge case occupies some space, and thus further raises the loading density.

Modern propellants are of three general types. Those available to handloaders on this continent are practically all of the "neutral" type, the individual grains tubular in form, the length usually several diameters. This type is called neutral because it tends to release the same amount of gas per unit time from the start of burning until the pellet is practically consumed. This is because gas is liberated from the entire surface of the pellet, outer surface and the wall of the hole alike. Thus, as the outside area becomes smaller, the reduction in area is offset by a proportionate increase in the area of the inner surface. The second type of powder is called "degressive," because its shape is such that its area, and hence the amount of gas, decreases as it burns. This type is usually in the form of thin "washers" or flakes, and unless of special composition, is never neutral or progressive in its burning characteristic. The third type is called "progressive," and frequently takes the

"Well, you lucky bum . . . where'd you get the li'l Walther?"

form of sticks with several holes parallel to the long dimension; it is only of academic interest here, since its use is confined to heavier ordnance.

The propellant, having been ignited by the primer flash, begins to burn, and in so doing, liberates gas. This causes a rise in pressure which speeds up the burning, and so on until sufficient force is built up to start the bullet moving, after which the pressure continues increasing until the bullet is well on its way up the barrel. Other things being equal, the maximum pressure depends upon the strength of the confinement, the amount and loading density of the powder and upon the composition of the powder used. The strength of confinement in practice is dependent in a large measure upon the bullet weight, caliber, bullet hardness, and the fit of the bullet in the barrel.

Since the bullet corks the only opening through which the pressure can be relieved, short of bursting the action, the initial chamber pressure is controlled to a considerable extent by the amount of force required to overcome the bullet's inertia and to force it into the rifling. This has been previously referred to as "forcement," and once the bullet has entered fully into the rifling, it practically disappears, and there remains only the necessity to accelerate the bullet as rapidly as possible during its passage up the barrel. Frictional resistance, the numerical value of which depends chiefly upon the smoothness of the bore, the materials used for bullet and barrel, and the rate of spin being imparted to the bullet, is still to be contended with. It will be considered as a constant since by no stretch of the imagination can it be altered by chamber shape.

The acceleration of the bullet is of prime interest since it is the major factor in achieving the desired muzzle velocity. The highest possible rate of acceleration is our goal, because whatever muzzle velocity is attained, it must be reached within the twenty to thirty inches of barrel length to which practical considerations limit us. Unfortunately, we cannot make use of the entire energy charge of the powder, since roughly two thirds of it are lost in heating the barrel and in gas escape from the muzzle, with only about one third being used in accelerating the bullet, thus giving it the energy to reach its target with sufficient remaining "punch" to do the work required of it. Obviously, no conceivable modification of chamber shape can affect the heat loss through bore friction and conduction, and the burning tolerance of the powder referred to above necessitates a moderately high remaining pressure at the instant of bullet delivery from the muzzle. If this remaining pressure drops too low, any unconsumed powder immediately ceases burning, and further, and more important, any drop in pressure of sufficient magnitude to reduce the muzzle loss would reduce acceleration of the bullet during the latter part of the barrel time and thus defeat our purpose. Forcement robs us of some of our energy, but since it is inevitable and is, indeed, necessary to build up the initial resistance without which our powder will not function efficiently, it can scarcely be considered as lost. The need for this confinement is evident from the way in which all smokeless powders will merely "squib" when burned in small quantities in open air. Here again we have a condition which applies alike to all chamber shapes, and cannot be influenced thereby.

It is evident, then, that our control over the release of energy is confined to: First, ensuring proper ignition, which is contingent upon a firing mechanism which will infallibly strike the primer with the same amount of force each time the trigger is pulled, the blow being sufficient to properly detonate the priming composition; second, the use of effective primers and placing the bulk of the charge in relation to the primer so that the entire charge is set alight instantaneously. There is no point in going into this further, since the first is up to the maker of the firearm and the second well taken care of by our very efficient modern primers, which, in the large size, will project their flash six inches or more beyond the end of a thirty-inch barrel. In view of this tremendous blast, it is indeed difficult to see how all powder within any reasonably shaped chamber could fail to ignite regularly. Our second, and most important, control lies in the proper choice of propellant, as to grade and weight of charge, or more correctly, loading density. It has been demonstrated that du Pont I.M.R. 3031 is the most efficient powder for use in cases having a powder capacity of between 2.2 and 2.6 cubic centimeters (see preliminary experiment and Figure 5, April, 1946 issue), when the bullet weight is fifty grains. While in some sizes of cases the best powder choice may vary as the bullet weight is altered over a wide range of weights, it can be demonstrated that for a given size of chamber, there is always one powder, or sometimes two, which give the best performance. Figure 5 also shows that for all propellants used there are some specific values of loading density, or powder charge, which will give results superior to other charges, both larger and smaller; *further, these charges are seldom, if ever, maximum charges.* This principle always seems to prove out experimentally, and is certainly reasonable since all the commercial propellants have been designed to operate at moderate and useful pressure levels. The men responsible for this design work, and those who went before them, have made a very thorough study of the requirements.

From the foregoing it is evident that, for a given diameter and weight of bullet, and a given size of cartridge case, we do not have any control over the muzzle velocity which can be attained at a stated pressure. If we increase the pressure, we can increase the muzzle velocity, but this is common to all shapes of chambers. In other words, the chemistry of the powder determines what can and what cannot be done, aside from making sure of mechanical perfection in the rifle mechanism itself. The chemical reactions occurring in the powder charge cannot be altered by the shape of the vessel in which the compound is burned any more than the boiling point of water can be changed by boiling it in different shaped pots. Water boils at around 212 degrees Fahrenheit regardless.

It is conceivable that differences in ignition might ensue if two widely different chambers were constructed (neither practical), one in which all the powder pellets were arranged in the form of a hollow sphere, with the primer in the form of a smaller sphere inside the powder charge, so arranged as to ignite every pellet simultaneously; the other in the form of a long chain with the pellets arranged end to end, with the primer at one end. Not only would ignition differ in these two widely different chambers, but it is entirely within the realm of probability that there would be a measurable difference in heat loss. The possible difference between any two chambers of similar powder capacity in actual practice cannot even remotely approach this divergence.

The actual amount of energy available for the propulsion of the bullet is, then, limited by the following: (a) The energy per unit, latent in the powder, which is further limited by

the loss of heat by conduction, friction, and residual force expended after the bullet has been discharged from the muzzle; (b) The density of loading; (c) The physical size of the chamber and; (d) The resistance offered by the bullet. It is very obvious that none of these factors, excepting possibly the limiting conditions of (a), can be affected by the shape of the chamber. Items (b) and (c) are purely dimensional, and (d) depends largely upon the "sectional density" of the bullet (which is usually taken as its weight "W," divided by the square of its diameter "d," and written—W/d^2), with slight modifications according to the material and structure of the actual bullet used. Note well this term W/d^2, as we will refer to it later. As to factor (a), we can obviously accomplish no change in the chemistry of the powder by any mechanical device, but there may be some question about improving the "thermodynamic efficiency" of the system, so let us look at this aspect a little more closely.

As has already been noted, only about one third of the energy in the propellant is used in propelling the bullet, the remaining two thirds being lost in more or less equal proportions in heating the mechanism (and the surounding atmosphere) and in muzzle blast. We must dismiss the heating effect, since it is dependent entirely upon the temperature difference between the heat of explosion and the temperature of the surrounding medium, with suitable modification in consideration of the "specific heat" of the materials involved. The heating effect is therefore constant for any shape of chamber, and can in no way be altered thereby. This is equally applicable to the frictional loss, which must similarly be dismissed as being constant for all chamber shapes. Muzzle blast will be dealt with in greater detail in Part Three of this series next month.

Now since an improvement due to reduction of muzzle loss may occur at any time between the instant of ignition and the instant of bullet departure from the muzzle, it is now desirable to investigate the acceleration factor and its relationship to velocity and pressure. *(To be continued.)* ♦ ♦ ♦

European Deer Hunt

(Continued from page 16)

the left-hand trail. The gamekeeper looked more and more worried, and I started to feel a bit relieved as the minutes ticked by. Somehow, sitting in a blind waiting to shoot a buck that would show up at a certain place at a certain time had little appeal as a sporting proposition. I had decided I would not be too sorry if those deer "stood me up" and failed to keep the appointment.

Nevertheless, at 8:35 two young bucks came mincing along the right-hand trail as per schedule. I just sat and watched them until the indignant jabs in my ribs made me realize the gamekeeper wanted something done about them. In order to make my shot a slightly worthy accomplishment at least, I tried to place my bullet exactly in the ear of the farthest buck. I squeezed off, jumped up, and shot at the second buck as he was zigzagging up a bank. Both deer fell dead and the gamekeeper almost followed suit. Imagine! Attempting a shot at a running deer and hitting it, too. *Wunderbar!*

The poor old gamekeeper had another shock when he could not find a bullet hole in either of the bucks. My first shot had been a true one, the bullet entering the ear canal and being deflected down into the neck muscles. My second shot had been a lucky one, the bullet entering just beneath the flag, missing the pelvic bone, and ranging through the paunch to the chest. The old gamekeeper said he had never seen such shooting, and I reckon he thought the second shot was planned as was the first. But in all truth, I was lucky to hit my point of aim on that ear shot, an ear being a small enough target at seventy-five yards and I was more than lucky to hit the second deer any place, much less dead center.

Mr. Beer seemed duly impressed at my bagging the running buck and was obviously pleased that I had done so. Evidently, the hunting was primarily to restock Mr. Beer's depleted larder, two deer being required, and Mr. Beer's buck had failed to show up. The gamekeeper was quite chagrined about failing to call his shots on two occasions and promised us that on our next trip everything would go according to plan.

Sure enough, on the second trip the gamekeeper called them just right. Mr. Beer and I got our bucks, but no credit was due me for my shot which was an absurdly easy one across 100 yards of open field. Enthused, Mr. Beer planned another trip.

On the third trip the old gamekeeper chose a blind that overlooked the original left-hand trail at a place farther back in the woods and assured me the big seven-year-old would follow it at least that far. The light was beginning to fail when I saw a deer come out of a thicket onto the trail. A glance through my field glasses told me it was a large buck, and I slid the rifle over the ledge of the blind. The deer disappeared behind some pine trees, and when I saw him again he was off the trail, browsing in some pretty thick bushes. I could see only a small patch of reddish brown, and I was waiting until I could make out just where to shoot.

"Shoot now," whispered the old gamekeeper.

It seemed to me that I could afford to wait for a decent shot, though I have lost deer by just such waiting, for this animal was not at all suspicious of our presence and was slowly working over toward an opening. The breeze was in my favor, too. Nevertheless, I figured the gamekeeper knew his business and squeezed off a shot with the top of the post in the middle of the brown patch. A squeal like a baby's cry told me I had connected, and 173 long paces from the foot of the blind brought me to my trophy. Unbelievably, the bullet went through the paunch and forced out about two feet of large intestine and three feet of small intestine from an exit wound no larger than the entrance wound.

About 25 per cent of the roe deer that I shot gave a cry when they were hit, even though most of them were dead before I could walk up to them. I have been told that our smaller whitetails sometimes cry like that, but I have never heard them myself. It is not a pleasant sound, especially when one knows that he is responsible for it, and I am glad that most of our American deer prefer to die more sedately and majestically.

A combat area may not be ideal for deer hunting, particularly on a high ridge over which passes a steady stream of artillery fire; open fields and springtime woods are not particularly congruous with that greatest of sports, still-hunting—but hunting is hunting no matter where and, game or no game, always profitable. I learned to respect the little roe deer as a game animal, demanding caution in hunting him and close shooting in bagging him. I learned the possibilities of the Garand rifle as a sporting arm, and I learned the very definite limitations of the carbine. ♦ ♦ ♦

Home-Made Spotting Scope

By TRUMAN HENSON

PART TWO

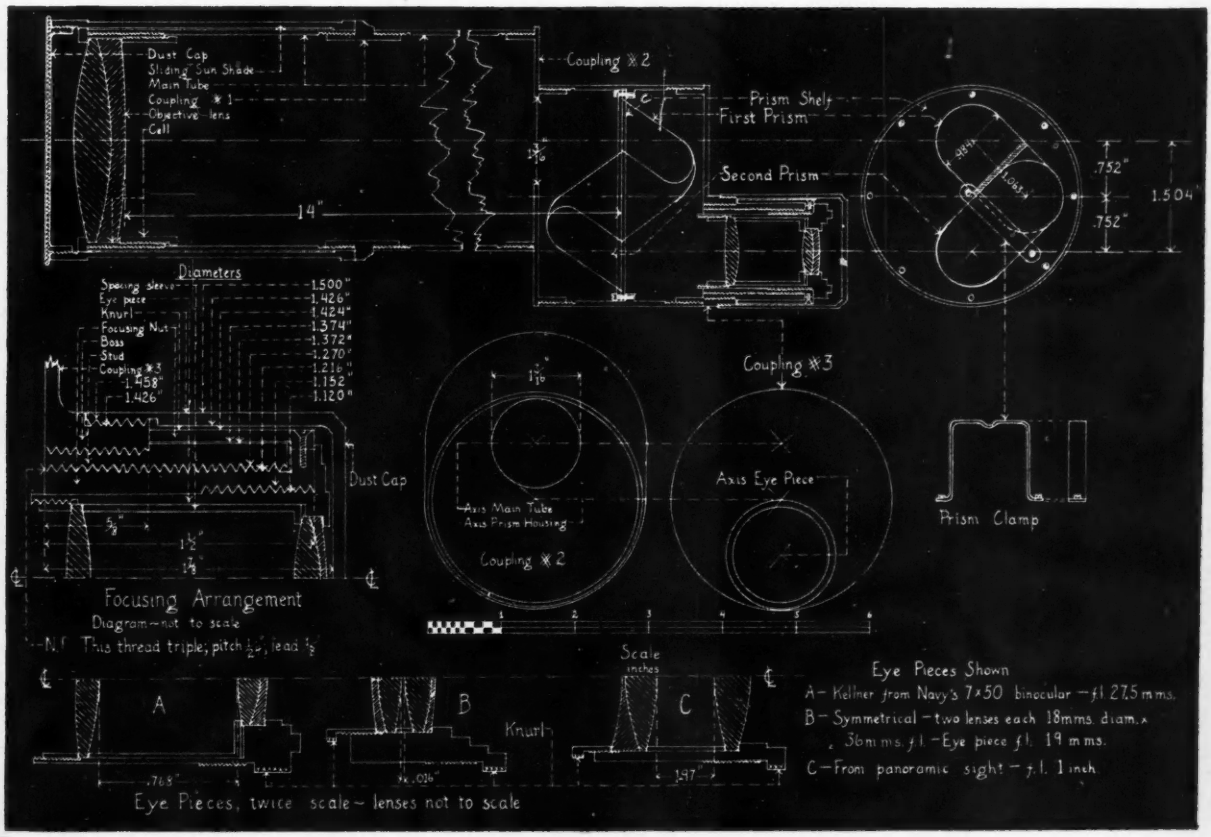
(In the first part of this article last month Author Henson described the required lenses and prisms for a spotting scope of this type, passed a few hints as to where they could be obtained, and laid out the design for the optical system of your scope.)

NOW FOR THE MECHANICAL PART. For this, you will need some tubing, some flat stock about one inch thick, some one-sixteenth-inch sheet stock, and a few other odds and ends. For most of the parts, I used Duralumin which is light, strong, and easy to work; but brass or steel will do. If you use Duralumin, get the hard-tempered variety. I used the grade known as "24ST."

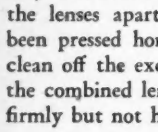
Take a look at the drawing which is self-explanatory. The dimensions are for my scope which, as stated, uses an objective 71 mm. in diameter by nineteen inches focal length, and prisms with bases 25 mm. by 52 mm. It can handle any reasonable eyepiece made up of lenses none of which exceeds 27 mm. (1.063 inches) in diameter. If your lenses or prisms are different from those shown, we have seen above how to vary the design to accommodate them. If only your objective is different, the only change you will have to make is in the diameter, or length, or both, of the main tube. Even if your objective is smaller, it might be well to use prisms the same size as those shown. They will pass more light than smaller prisms, and dimensions for the prism shelf and housing, and for a suitable focusing arrangement to be used with them, are all worked out for you on the drawing.

The first thing to make is the cell for your objective. It consists of two parts, one of which screws into the other. The outer part has a rim, a sixty-fourth or so larger than the outside diameter of the main tube. This is to act as a stop for the sliding sunshade, to prevent its being pulled all the way off. I used forty threads per inch in threading my cell, and for all threads throughout the scope except for the focusing nut. The cell should just fit the lens so the latter will drop in or out of its own weight, without any forcing that may chip or crack the glass.

Your objective may come in two parts, and if so they will have to be cemented together. Instructions for this will come with the lens, but do not try to use stick balsam to cement a large lens. If you do, you are apt to get air bubbles in the



balsam between the glasses. Get liquid Canada balsam lens cement. Clean both lenses thoroughly with a little soap and water, then with alcohol, next with a few drops of nitric acid, and finally with alcohol again. Wear rubber gloves so you can handle the glass without leaving fingerprints. If the double convex, or crown glass, lens has more curvature on one side than on the other, make sure which side fits into the concavity of the flint glass lens. Heat both lenses in water—very slowly, or you may crack them—to the point where they are as warm as you want to handle. Lay the cleaned and warmed flint glass lens on a clean towel or paper, concave side up, and pour about a half teaspoonful of liquid balsam into it. Look for bubbles, and if there are any, puncture them. Take the cleaned and warmed crown glass lens, with the proper side down, and put it down slowly into the concavity of the flint, so that it touches the cement first in the center and pushes it out evenly toward the sides. Press down slowly and evenly, and you probably will avoid bubbles. If any appear, you will have to take the lenses apart and try again. When the crown lens has been pressed home without bubbles, use a rag and alcohol to clean off the excess cement which will have squeezed out, put the combined lens into its cell and screw in the retaining ring firmly but not harshly. Put the lens and cell away in a warm, but not hot, dust-free place for two or three weeks to dry. Then clean off again with alcohol and it will be ready to use. Alcohol will dissolve the balsam cement, so do not soak the cemented lens in alcohol.



Meanwhile, do the rest of the machine work. The joint in the main tube, with a coupling (No. 1) provided with a raised shoulder, is to furnish a stop at the inboard end of the travel of the sliding sunshade. Note that all of the sunshade, except for a quarter of an inch at the inboard end, is bored out to be a sliding fit on the rim you left on the objective cell. The last quarter inch is bored to a sliding fit on the main tube. The inside of the front end of the sunshade is threaded to take the front dust cap.

The objective cell, sunshade, dust caps, main tube, and first coupling are all simple turning, boring, and threading jobs. Just be sure that everything is square and true. The prism housing is also a perfectly plain and simple turning, boring, and threading job.

After these parts are made, you are ready for coupling No. 2 which goes between the main tube and the prism housing and for coupling No. 3 which goes between the prism housing and the eyepiece. In each case, the axis of the part of the coupling which screws into the prism housing is distant from the axis of the part of the coupling which screws into the main tube, or takes the eyepiece, by exactly one half the distance we found above between the axis of the objective and the axis of the eyepiece. Thus, the centers of the respective ends of each of these couplings are separated by .752 inch in my scope, and will be in yours if you use the same size prisms. Use a piece of your one-inch stock for these couplings and, since they act as the ends of the prism housing and one end of the main tube, leave a web about one-sixteenth inch thick between the two threaded parts. In this web, in coupling No. 2, bore a hole, concentric with the main tube, just a little larger than required to let the beam of light through. Thus, the web will act as a diaphragm, or stop, to eliminate stray light and interior reflections.

To obtain the size of this hole, make a drawing. Lay out a horizontal center line equal in length to the distance between the rear of the objective lens and the base of the first prism. At the end, draw a perpendicular line, centered on the first line, and as long as the diameter of your objective lens (less whatever is cut off by the cell). At the right end of the center line, lay off another perpendicular, centered on the first line and as long as the width of your prisms (25 mm. in the case of my scope). Now, draw two converging lines, joining the two upper extremities and the two lower extremities of the two perpendiculars and the last two lines will delimit the beam of light which enters through the objective and gets through the prisms. Next, draw another perpendicular, across the center line and the two converging beam limit lines, at a distance to the left of the line which represents your prism, equal to the distance the web is going to be from the base of the first prism when the scope is put together. Then measure the length of this last perpendicular between the two converging beam limit lines; and that distance, plus about one-sixteenth inch for good measure, is the diameter for the stop, or diaphragm, hole in the web. In my scope, the hole is one and three-sixteenths inches in diameter.

I made these couplings by first carefully laying out and center-punching a center on one side, and then another center exactly opposite on the other side, of each blank. Use care and a magnifying glass for this, and get the centers exactly opposite each other. I then put the blank of coupling No. 2 in the chuck, carefully centered it on the mark, using the glass, and turned, threaded, and bored out the end which screws into the main tube. Bore the diaphragm hole in the web at this stage. I then bolted a piece of one-half-inch stock on the faceplate, and after facing, bored and threaded it to fit the end of the coupling I had just finished to act as a chucking piece. Next, I marked a new center on the blank side of the coupling, distant .752 inch (for my scope) from the first center marked there. A line was then scribed through those two centers and clear across the blank and also across its edges. Then, screwing the coupling into the chucking piece, I moved the latter around on the faceplate until the coupling was centered on the new center mark (use a magnifying glass here) and bored, turned, and threaded it to fit the prism housing, taking care to preserve the marks before scribed on the edges. With the coupling still in place on the faceplate, I screwed the prism housing up tight on the coupling and, putting a sharp tool in the slide rest and turning the work until one of the lines scribed across the edge of the coupling registered with the point of the tool (use a glass here, too), I lightly scribed a short line on the housing side of the coupling and on the housing itself, at each end, by running in the slide rest and then moving the saddle sideways. I then gave the spindle an exact half turn (by counting the teeth of the bull gear past a stop) and repeated with the other side of the housing, thus getting witness marks lined up with the direction of offset.

Next, I took the faceplate off the lathe, with the work still on it, and chucked the No. 3 coupling blank which I centered to the mark with the magnifying glass, turned, bored, and threaded to fit the prism housing. Taking this out of the chuck and putting back the faceplate with the No. 2 coupling and prism housing still in place, I screwed the new coupling hard into the housing, and then, by the same method used to make the witness marks, made similar marks on the housing side of the new coupling and also right on around its edges and across its blank side (making an identifying mark on that end

of the line which was away from the axis of the main tube). I then removed everything from the faceplate except the chucking piece and marked a new center on the line scribed across the blank side of the new coupling, distant .752 inch from the original center of that coupling, and distant 1.504 inches from the axis of the main tube. I then screwed the coupling back into the chucking piece and moved the latter around on the faceplate until the coupling was exactly centered on the new center I had just marked. From there on, it was a simple job to turn and thread the eyepiece boss on the outside for the dust cap, and bore and thread it inside for the eyepiece stud.

When both couplings were done, I screwed them back into the prism housing to the witness marks and drilled and tapped a hole through each end of the housing and its coupling for a 2-56 setscrew.

The next, and only other, really precise job was the shelf for the prisms. This was made of two thicknesses of one-sixteenth-inch stock. I took two square pieces of the same size, about one-half inch longer on a side than the diameter of the prism housing, and, working with care and a magnifying glass, scribed exact diagonals on one of them. At the intersection of the diagonals, I drilled a center hole with a No. 53 drill to pass the body of an 0-80 screw. Then, near each of the corners, and exactly on the diagonals and exactly equidistant from the center, I drilled four holes with a No. 40 drill, just big enough to take a 3-48 screw. I then faced a piece of one-quarter-inch stock a little larger than the squares, to form a backing piece. To this I clamped my two squares and drilled the five holes on through the second square, and then, with a No. 56 drill in the center and a No. 47 drill in the corners, went on through the one-quarter-inch piece, tapping the latter holes 0-80 and 3-48, respectively. Next, I measured out on one of the diagonals exactly .752 inch from the center and marked it with my scriber, used as a very fine center punch. Then, after fastening the three pieces together with four 3-48 screws through the corner holes, and an 0-80 screw through the center hole, I bolted the backing piece to the faceplate so as exactly to center the mark I had just made with the scriber. On that center I bored a .984-inch hole through both the one-sixteenth-inch squares. Removing the four corner screws, I gave the two one-sixteenth-inch squares an exact one-quarter turn by pivoting them on the center screw and shifting each of the corner screw holes in the squares to the next screw hole in the backing piece, ran in the screws again and bored another .984-inch hole through both squares. When I had repeated this procedure once more, I had three 25 mm., or .984-inch holes so spaced that lines through their centers would form a right-angle isosceles triangle, 1.504 inches on the base and 1.063 inches on each of the other sides.

The backing piece, with the square shelves still fastened to it, was then taken off the faceplate and a circle, centered on the original center where the diagonals crossed, was scribed on the top square on a radius three-thirty-seconds inch less than one half the inside diameter of the prism housing. On this circle, eight equidistant holes were drilled with a No. 44 drill through the two squares and then drilled No. 50 through the backing piece and tapped 2-56. Screws were turned into these holes, the four corner screws and the center screw removed, the work put back on the lathe, carefully centered on the center screw hole, and the outside of the two squares turned down to circles making a light push fit inside the prism housing. The two prism shelves were then taken off the backing piece, lines were scribed down the inside of the prism housing from the witness marks, and the shelf marked with the diagonals was put into the housing and down onto the shoulder, where it was shifted around until the diagonal which crossed two of the 25 mm. holes jibed with the witness marks. Using the shelf as a template in that position, the eight small holes were drilled through the shoulder with the No. 50 drill and tapped 2-56.

Next, the stock between the middle and left-hand holes was cut out of one shelf, and the resulting oval hole carefully filed until the base of one of the prisms would just slip into it. The stock between the center and right-hand holes of the other shelf was similarly removed. Thus, each piece had one oval hole into which the base of a prism just fitted, and one round hole. When the two shelves were held together and the prisms inserted, the base of each prism was supported in part by the base of the other and in part by the stock between the oval and the round hole in the other shelf. The prisms should be held in their slots by clamps of light sheet stock, as shown in the drawing.

The focusing stud, nut, and sleeve require no comment, except to point out that the reason for the triple focusing thread is to provide a reasonably rapid focusing motion without using a thread so coarse as to require thicker parts. The drawing shows the three eyepieces I made, which screw into the inside of the focusing nut and are interchangeable. As stated above, they give me powers of about 17.5X, 19X, and 25X. Be sure to set the lenses of the short focus eyepieces far enough into the eyepiece tubes, as shown, or you will not be able to focus them on infinity, even with the focusing nut screwed all the way in.

The inside of everything should be finished a dull flat black, to avoid reflections which would result in glare or fog. A coat of matte optical black enamel left mine too shiny, but two more coats of dime-store flat black did the trick. Paint would soon wear off the inside of the sunshade, through friction; so I blackened that by the method Baker recommends for aluminum in his gunsmithing book. It has lasted so far, and next time I think I'll use that method on the inside of the entire scope since, without lacquer, it leaves a flat, dull finish. I covered the outside of my main tube and eye shade with leather; and the shoulders turned in the sunshade and those made by coupling No. 1 and by the overhang of the web of coupling No. 2, shown in the drawing, are to protect the ends of the leather. You may prefer to use enamel.

If your scope turns out as well as mine you will experience a lot of satisfaction. ◆ ◆ ◆

PAPER PROBLEMS

With RIFLEMAN circulation passing the 120,000 mark, the problem of finding enough paper has become the major NRA headache. RIFLEMAN appearance this month is a classic example. In order to increase the number of pages, in line with a policy of giving readers more articles each month, it was necessary to fill in with a different paper . . . and you'll notice that appearance suffers. Until unlimited supplies of paper are once again available, it's either "take what you can get" or reduce the size of the magazine. We believe RIFLEMAN readers will agree that first consideration is a full-size magazine reaching them every month.

The Old Coach

"FIRST DAY OUT"

OVER AT THE RANGE TODAY the sun was beaming down, the birds were singing, and in the air was that message of spring that sets all life aglow. Several of the boys were clearing off the Dewar course, knocking down the weed stalks that had weathered the winter, and then came the "pop-pop" of .22's —echoing the news that the small-bore outdoor season had opened again. And with it come new things to learn for many of you fellows who have so far known only the gallery game. There will be little differences like firing on a range where both the target and the firing point are in good light, especially noticeable if you have been shooting from a dark gallery firing point. There will be big things like wind doping and getting good position on uneven ground . . .

Let's hope that the first day you were out on the range you discovered what "wind doping" really means. In the gallery you hardly realized that the windage screw in your rear sight was for anything else than bringing your wandering group into the ten-ring at fifty feet. But that adjustment was put there because you will need it when it comes to beating the befuddling wind you are bound to meet.

Bear in mind that it is just about as difficult to shoot a .22 small-bore rifle at 100 yards as a .30-'06 at 300, or even 500 yards. Again, it is really more difficult to conquer the small bore at 200 yards, especially if there is any wind astir, than it is to do well with the '06 at 800 or even 1,000 yards. Wind will blow your little bullet clear off the target frame, right or left. A twelve o'clock wind will blow your bullet up; one from your back, a six o'clock wind, will blow it down. A strong, cold wind blowing into the muzzle of your rifle will so chill the barrel as to make the rifle shoot low. A barrel heated in a sizzling hot sun will shoot high. Ammunition with a certain kind of grease lubricant will load and extract with difficulty in a cold barrel. Under the same conditions the wax-base lubricant used by several companies before the war gave no such trouble. A sure way to degrease greased ammunition is to leave a filled loading block in the hot sun.

If you have not done so, zero your rifle at twelve and a half yards and write this zero reading of your rear sight, elevation and windage, in your record book on your cartridge block in the lid of your kit box. If you do not do this, you will be forever fishing and hunting for your elevations. You will never be able to use a table of elevations and you will be the loser. Have front and rear apertures large, on dark days larger yet, and do not cut them down until experience dictates that a smaller hole will suit you better. Usually on a cloudy, moist day you will need less elevation than on a dry, hot one. A target suddenly exposed to bright sunlight usually signals a reduction in elevation of a click or two. A target suddenly thrown into shadow usually means: Add a bit of elevation.

On your first trip to the average small-bore range you will discover that the firing point may be uphill or downhill from the target frames. Once in a blue moon you may find the firing point and the targets on a level. If when you lie down you find your feet high and your shoulders low, try folding your ground cloth several thicknesses and lay this under your elbows. But, be sure your elbows are solid and can't slip out of position. No one can shoot well with a kink in the neck, twisted shoulders, jackknife backbone, or a cramped belly. You must be in a comfortable position when your sights are aligned on the bull. After doing all you can for the elbows, complete the job by shifting your hips to raise or lower the muzzle or to move the muzzle in the proper direction to give you a comfortable, natural position. Keep in mind that your elbows are the pivot and must be kept set. To make these necessary shifts in position other than with the hips produces a strained position. A strained position means a poor job of shooting.

Place your spotting scope to the left of your face if right-handed, to the right if you are left-handed. Have the eyepiece located so you can turn your head from the stock and peek through the scope with your left eye. This gives your aiming eye a second's rest. Don't get completely out of position each time you look through the scope as so many small-bore shooters do. Get into position and stay there until your string is fired.

Have your cartridge block under your loading hand. Keep the butt plate in your shoulder while shooting the string. Open the bolt or drop the lever, remove the empty case, pick up and chamber a fresh cartridge, close the bolt or lever—all with the butt in place in your shoulder. To bring the breech closer to the loading hand, let the sling hand and arm swing to the right or left. Some good shots twist into figure "8's," struggle and sweat, yank the bolt, and fish for ammunition, but this contortion hasn't made them good shots. They shoot well in spite of their poor form. And good form is very necessary to a small-bore shooter, especially outdoors. And, by the way, a properly stocked lever-action rifle is just as easily operated prone as any bolt gun. So don't shy off a lever action if you prefer that style.

We'll not go into the intricacies of wind doping here since the subject is pretty thoroughly covered in another article in this issue written by Edwards (Pete) Brown, one of the nation's top-ranking prewar small-bore competitors. Suffice to say, it is an important subject and success in the outdoor game is dependent upon learning something about it.

One cold, windy day I stood on the firing line behind a noted small-bore shooter from Cheyenne, Wyoming—a southpaw by the way. He won that match with ease simply because he is one of the most skillful wind dopers in America. I watched him watch the wind. He changed his sight setting very little; once in awhile he would take off or add a few clicks. But he constantly studied and watched the wind. While others within feet of him scattered holes on the target, his group was a nest right in the rings that count. It can be done, and you will learn a lot by watching men who can do it.

Nearly all the small-bore shooters I know have had trouble all winter with occasional shots which go high or low due to wartime ammunition. Years ago it was common practice to weigh each cartridge to be used in a serious match. Cartridges with an over- or underload of powder or primer mixture will vary in weight with the standard. Discard these and use the lot of uniform weight. And may Luck be peeping over your right shoulder. ◆ ◆ ◆

POWDER SMOKE: THE NEWS DESK . . . READERS COMMENTS

THANKS FROM LONDON

London, England.

Editor:

In response to my "Letter from Wales" which appeared on Page 19 of the January issue of THE AMERICAN RIFLEMAN, I have received a flood of correspondence from the U. S. A.

I would like to say how much I appreciated the open-hearted generosity shown by several of my postal friends. I had offers of all the American catalogues, and one kind gun fan from Cleveland wanted to send a target revolver. He said "the boys would derive a lot of satisfaction from shooting this sweet handgun." In the meantime he sent me a catalogue.

It is hard to express one's feeling at such actions.

Arthur Bolsom.

BRADFORD'S .30-40

Portsmouth, Virginia.

Editor:

In Jim Berryman's article, "Two Guns for Verde Valley," (April, 1946) mention is made of a .30-40 caliber Winchester Model 1894. If Winchester ever made a .30-40 in any other than the 1895 model, I would like to see it.

K. E. Brohard.

So would we and so would Berryman. Old man Bradford's hoss killin' weapon was a Model 94 all right—but in .30-30 caliber.—EDITOR.

CONCERNING REGISTRATION

Hamilton, Ontario.

Editor:

May I commend you for your campaign to rally shooters in the U. S. A. against the attempts being made for compulsory registration of arms.

Registration of revolvers and pistols has been in force in Canada for some years, and for a time during this last war it was necessary to register rifles and shotguns as well. Unfortunately Canadian shooters were not blessed with the leadership of a representative publication such as THE AMERICAN RIFLEMAN and made no organized protest against the passing of a gun-registration law.

It is admittedly no hardship to register one's handguns, but let us consider what has happened in countries which have been invaded by a cruel and ruthless enemy or in which an unscrupulous political party has siezed the reins of government. Consider what a help in eradicating a threat to their nefarious designs a list of firearms owners would be. The finger would be on all gun owners pronto. Surely no good government in any land has cause to fear its arms-owning citizens, whom it should be able to depend upon for support and aid in times of stress and trial, *provided it has qualified for and deserves such support.*

It also follows that any government which fears its arms-owning citizens could be suspected of designs which under close scrutiny would not be popular with its citizens, the majority of whom can be relied on to do the right thing by their country.

It seems to me that instead of making more laws which would not hamper the criminal in the least, we should sternly punish the criminal user of firearms to the full extent of the laws now existing, allowing no pulling of punches on account of drag, influence, wealth, or any other condition of the criminal.

E. H. Cuckow.

CLARIFICATION OF RULES

Section 12-11 of the Small-Bore Rifle Rules, revised to January, 1946, reads:

"Competitors will continue firing when, in an individual match, they have made a perfect score (all shots X's). Firing will continue until the competitor makes a hit outside the X-ring. Other competitors who may have been squadded on the same target will be re-squadded on the range."

This rule appears in the 1946 rule book on Page 33 in the section dealing with "Long-Range Procedure." *It applies equally to all small-bore shooting,* gallery and mid-range, as well as long range. In matches where no X-ring is used the ten-ring shall apply.

Note that the rule states: ". . . in an individual match. . . ." The competitor must have a perfect score in the entire match, not one stage of a multi-stage match.

In the case of gallery or mid-range shooting the procedure will be to frame additional targets in the exact manner used in the original match. The competitor then continues to fire, under the same rules and regulations which applied in the original match, until a hit is made outside the ring of highest value. In scoring the shots fired after an original match, the bull's-eyes will be considered in the order numbered. In matches in which more than one shot is fired at a bull's-eye, only those bull's-eyes will be considered in which all hits are within the ring of highest value.

1946 NRA SUMMER LEAGUE CHAMPIONSHIP

Back in 1942 when the war called a halt to nearly all league and tournament activity, plans were being made for an outdoor league program similar to the one that was operated so successfully for gallery shooting in the past.

This year, in keeping with the tremendous renewal of activity in tournament shooting, those plans are going into effect and the first NRA Summer League Championship is to be held.

These Summer Leagues are in answer to a long felt demand for a program to create and hold the interest in group competitive shooting through the summer months. Group shooting offers companionship and encouragement to the new shooters. To the veterans it means friendly rivalry and regular sessions of competitive shooting that are more enjoyable because they are in company with regular shooting friends.

Leagues will be eligible that are made up of teams within the membership of a single club, as well as leagues whose component teams represent industrial, fraternal, municipal, and other organizations. Whatever the type of sponsoring organization, the league should be formed for the ultimate purpose of providing the best shooting for the greatest number. This means that consideration must be given to the new and inexperienced shooter and to the gallery, four-position, and .30 caliber shooter. Courses of fire can and should be set up so that these varied classes of shooters can fire with pleasure through the summer. The experts will want their Dewar Leagues and National Match Course Leagues, of course, but there certainly should be simplified courses and two- or three-position leagues as well.

Winning teams from every affiliated league, regardless of type or course of fire, will be eligible to compete for State and National Championship awards over predetermined courses of fire. All league scores fired over courses used for National Classifications will be used in determining National Classifications for league members.

League requirements, entry blanks and complete details of the 1946 NRA Summer League Championship will be sent to all club secretaries, State associations and organizations affiliated with the NRA. However it is vital that shooters do not wait for entry blanks before organizing leagues.

Only complete leagues may be entered. The Headquarters office does not have facilities to form leagues from team entries.

Entries in the Summer League Championship will be accepted from any league whose member teams represent NRA affiliated organizations or, in special cases where affiliation is not possible, whose member teams are composed of individual NRA members.

Shooters should get busy now with league plans for an outdoor season that will be the best in many years.

1946 REGIONAL TOURNAMENTS

As announced in the April Tournament News, the Regional Tournaments are back in the competitive picture this year. Many persons will be interested in the '46 Regionals who do not receive the News, so much of the former story is being repeated here.

Some Regionals are definitely scheduled, others are in the formative stage, and still others are completely unsettled. In those regions where no tournament locations are shown, clubs and competitors are requested to see what they can do to obtain a proper tournament site. Send your suggestions to the NRA Headquarters, but remember—the tournament must serve *all* shooters in the region—not just a few. Also remember that approximately one hundred small-bore targets and fifty pistol targets will be required for a regional tournament.

Regional Tournament competitors will be classified according to the five classes in the NRA Classification System. In the first three events on each program prizes will be awarded to an Unclassified group. However, after the firing of these three events, all Unclassified shooters will be classified on the basis of the scores fired in them.

Regional Championship Aggregates will consist of eight individual matches as follows: Rifle: 40 shots at 50 yards, 40 shots at 50 meters, 40 shots at 100 yards, and the Dewar Course, each fired once with metallic sights and once with any sights. Pistol: 20 shots slow fire at 50 yards, 20 shots timed fire at 25 yards, and 20 shots rapid fire at 25 yards, and the National Match Course, each fired once with the .22 pistol or revolver and once with the center-fire.

PACIFIC NORTHWESTERN REGION

Rifle Tournament: Seattle, Washington, August 24 and 25.

Pistol Tournament: Seattle, Washington, August 10 and 11.

This region includes Oregon; Washington; that part of Montana lying west of the line Havre-Livingston, including all of Hill, Chouteau, Judith Basin, Meagher, and Park Counties; that portion of Idaho lying generally north and west of Twin Falls, the Big Cama Prairie and the Lost River Mountains, including all of Lemhi, Custer, Elmore, and Owyhee Counties; that portion of California north of Chico, including all of Plumas, Tehama, Trinity, and Humboldt Counties.

FAR WESTERN REGION

Rifle Tournament: Glendale, California, July 6 and 7.

Pistol Tournament: San Francisco, California, July 19, 20, and 21.

The area included in this region is Arizona; Nevada; and that part of California lying generally south of Chico, including all of Sierra, Butte, Glenn, and Mendocino Counties.

NORTHWESTERN REGION

Rifle Tournament: Denver, Colorado, July 27 and 28.

Pistol Tournament: Denver, Colorado, August 2, 3 and 4.

This region consists of North and South Dakota; Wyoming; Colorado; Utah; that portion of Montana lying generally south and east of the Little Lost River and the Lost River Mountains, the Big Cama Prairie, including all of Clarke, Butte, Blaine, Camas, Gooding, and Twin Falls Counties; that portion of Nebraska lying generally west of a North-South line drawn through Lincoln, including all of Cedar, Wayne, Stanton, Colfax, Butler, Seward, Saline, and Jefferson Counties; that portion of Kansas lying generally north of the Smoky River and west of the line Norton-Hill City-Wakeeny, including all of Norton, Graham, Trego, Gove, Logan, and Wallace Counties.

SOUTHWESTERN REGION

Rifle Tournament: Tulsa, Oklahoma, July 5, 6, and 7.

Pistol Tournament: Austin, Texas, July 13 and 14.

This region includes Arkansas; Louisiana; Oklahoma; Texas; New Mexico; and Kansas except the northeastern area, being generally east of the Big Blue and north of the Kansas Rivers, but including all of Washington, Riley, Wabaunsee, Osage, Franklin, Miami, Phillips, Rooks, Ellis, Rush, Ness, Lane, Scott, Wichita, and Greeley Counties, and excepting the northwestern area lying generally north of the Smoky Hill River and west of the line Norton-Hill City-Wakeeny.

MIDWESTERN REGION

Rifle and Pistol Tournaments: Dates and locations undetermined.

This region includes all of Wisconsin; Minnesota; Iowa; Missouri; Illinois; and the northern peninsula of Michigan; that portion of Indiana west of the line South Bend-Bradford-South Bend-Indianapolis-Tell City, including all of St. Joseph, Marshall, Fulton, Miami, Howard, Tipton, Hamilton, Marion, Johnson, Brown, Monroe, Lawrence, Orange, and Crawford Counties; that portion of Kentucky west of the line Owensboro-Hopkinsville, including Davies, McLean, Hopkins, and Christian Counties; that portion of Kansas lying generally east of the Big Blue and north of the Kansas Rivers, including all of Marshall, Pottawatomie, Shawnee, Douglas, and Johnson Counties; that portion of Nebraska lying generally east of the north-south line drawn through Lincoln, including all of Dixon, Thurston, Cuming, Dodge, Saunders, Lancaster, and Gage Counties.

EASTERN REGION

Rifle Tournament: Probably Altoona, Pennsylvania, July 5, 6 and 7.

Pistol Tournament: Probably Quantico, Virginia, July 5, 6, and 7.

This region consists of New Jersey; Delaware; Maryland; the District of Columbia; all of Pennsylvania, excepting Erie, Crawford, Mercer, Lawrence, and Beaver Counties; New York west of the general line from Oswego to Binghamton, including all of Cayuga, Tomkins, Tioga, Sullivan, Orange, Putnam, Westchester, Rockland, Bronx, New York, and Richmond Counties, and all of Long Island; Virginia, excepting that portion south of Warwick, James City, New Kent, Hanover, Goochland, Fluvanna, Albemarle, Augusta, Bath, Charles City, York, and Elizabeth City Counties; West Virginia excepting that portion south and east of Pocahontas, Webster, Nicholas, Kanawha, Boone, Logan, and Mingo Counties.

NORTH CENTRAL REGION

Rifle Tournament: Mt. Gilead, Ohio, July 27 and 28.

Pistol Tournament: Probably Jackson, Michigan, date undetermined.

This region consists of that portion of Ohio and Indiana lying generally east of a line South Bend-Indianapolis- Bedford-Tell City, and including all of Elkhart, Kosciuski, Wabash, Grant, Madison, Hancock, Shelby, Bartholomew, Jackson, Washington, and Harrison Counties; that portion of Kentucky lying generally east of the line Owensboro-Hopkinsville, and including all of Hancock, Ohio, Muhlenberg and Todd Counties; the southern peninsula only of Michigan; and only Erie, Crawford, Mercer, Lawrence, and Beaver Counties in Pennsylvania.

SOUTHEASTERN REGION

Rifle Tournament: Greensboro, North Carolina, date undetermined.

Pistol Tournament: Tampa, Florida, June 28, 29, and 30.

This region includes Tennessee; North Carolina; South Carolina; Georgia; Alabama; Mississippi; Florida; that portion of Virginia south of Warwick, James City, New Kent, Hanover, Goochland, Fluvanna, Albemarle, Augusta, Bath, Charles City, York, and Elizabeth City Counties; and that portion of West Virginia south and eash of Pocahontas, Webster, Nicholas, Kanawha, Boone, Logan, and Mingo Counties.

NORTHEASTERN REGION

Rifle and Pistol Tournament: Location and date undetermined.

This region includes Maine; Vermont; New Hampshire; Massachusetts; Rhode Island; Connecticut; and that portion of New York south and east of the St. Lawrence River and a line drawn from Oswego to Binghamton, including all of Oswego, Onondaga, Cortland, and Broome Counties, and excepting Sullivan, Orange, Putnam, Westchester, Rockland, Bronx, New York, and Richmond Counties, and all of Long Island.

QUALIFICATION MEDALS

The NRA again has attractive Junior and Senior Qualification Medals and Pins to award.

The Senior Qualification Medals and Pins are available to NRA members who are listed in the 1946 Classification Booklets for Rifle and Pistol or on the basis of scores listed on Temporary Classification Cards issued at Registered Tournaments. These awards may also be earned by qualifying on your home range over any of the accepted qualification courses. Prices of awards: medals, $1.00; brassards, $.50; pins, $.75; certificates, $.50.

Junior Qualification awards may be earned by firing the prescribed Qualification Courses listed in the Junior Rifle Handbook.

BOOK REVIEWS

THE WEAPON SERIES

By ROGER MARSH and GEORGE R. GANS

This is a series of monographs intended for the student of gun design and development. To date there are five pamphlets in the series.

No. 1, by Roger Marsh, (edition limited to 500 copies) is a twelve-page dissertation on "The First Model Maxim Automatic Machine Gun." It gives much historical background and a very extensive technical description of the earliest Maxim Machine Gun, well illustrated by seven excellent diagrammatic line drawings. The student of machine-gun development will find that it sheds much light on the origin of weapons of this type. Price 50¢.

No. 2, by Roger Marsh, of which 1,500 copies were produced, gives a most exhaustive coverage to three of the .45 caliber automatic pistols that figured in official government tests. These are the Grant Hammond, tested at Springfield Arsenal in 1917 under the personal supervision of the reviewer; the Savage .45, and the Schouboe .45, which latter was notable for the use of a very light high-velocity bullet with a core of wood. The treatment is supplemented by twenty-three splendid cuts. The cost is $1.50, which to the ordinary reader would, no doubt, seem excessive for a thirty-three-page pamphlet, but to the serious searcher after the kind of knowledge contained would seem reasonable indeed.

No. 3, by George R. Gans, (1,500 copies produced) is a well-illustrated, seven-page description of the full-automatic Mauser Pistol Model of 1932. Price 50¢.

No. 4, by George R. Gans, is a profusely illustrated, seven-page discussion of the Russian Tokarev Semi-Automatic Rifle. Number of copies produced not known. Price 50¢.

No. 5, by Roger Marsh, is the last one printed to date, and covers the Baby Nambu Japanese 7 mm. Pistol. Four pages, excellent illustrations, including large-scale line drawings of the cartridges. Price 50¢.

The pamphlets are obtainable from The Weapon Series, 224 Streetsboro Street, Hudson, Ohio.—J. S. H.

COMMONSENSE SHOTGUN SHOOTING

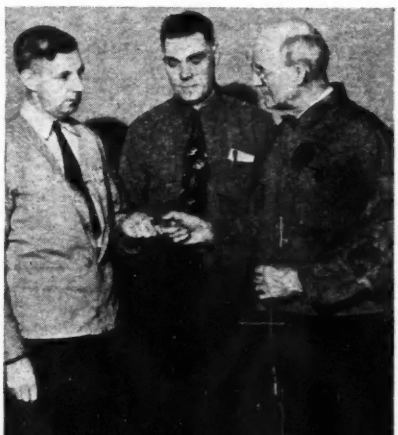
By FRED ETCHEN

It has long been a subject for comment by riflemen and pistol shooters that the shotgun clan lacked any training literature of the type so common in the field of the rifled tubes. It is true that a major portion of the shooting books published have dealt with shotgun shooting. But the subject matter has been pure reminiscence or has concerned itself with the habits of the game and game birds which are the favorite targets of the scattergun clan, plus some comment on proper loads, barrel lengths, and stock dimensions. On the subject of basic training in the fundamentals of safe, accurate gun handling the field of shotgun literature has been pretty barren during the past quarter-century.

Fred Etchen has been notably successful in working out a system of shotgun instruction, beginning with fundamentals and building up into the higher degree of proficiency required for high-grade performance on the trap and skeet ranges. *Commonsense Shotgun Shooting* is an effort to put into book form this system of instruction which has worked so well under Mr. Etchen's personal supervision. The book contains a wealth of practical information on gun safety (a topic too often slighted in shotgun instruction), on gun fitting, and on shooting form. It is specific in its application to the trap and skeet ranges and it is to the tyro in these sports that the book will be of particular value. The principles outlined will, of course, be as valuable to the field shooter as to the target shot, but the author somehow misses his cue by not clearly pointing out how these principles apply to the upland game field and duck blind. Modern visual education technique could have been applied to the illustrations to make them much more graphic and helpful. As a matter of fact, seventeen of the thirty-two illustrations are merely pictures of outstanding figures in the trap and skeet world or cuts of the various models of shotguns similar to those used in manufacturer's catalogues.

Commonsense Shotgun Shooting is definitely a start in a much-needed direction in the field of shotgun literature. It is excellent as far as it goes and therefore is to be commended. However, it suffers the handicaps of incompleteness with regard to field shooting, of inadequate illustration to support and explain its excellent text, and of a price ($6.00) which is all out of proportion to its 186 pages of instructional text.—C. B. L.

(Cloth, 32 illustrations and diagrams, 202 pages, $6.00. Published by Standard Publishing Co. Available through the NRA Book Department.)



Frank D. Elwell, "the Grand Old Man" of the Flint Rifle and Pistol Club, is presented with the ninth bar to his Army Expert qualification medal. Mr. Elwell has for the past twenty-nine years fired this qualification, and even now has a leg on the tenth bar. He was winner of the Wimbleton Regional over 1,000 yards in 1934, National Team member in 1922, officer in five clubs in Ohio and Michigan, and past Director of the NRA. At present he is Executive Vice President of the Michigan State Rifle and Pistol Association.

INFO ON DCM PURCHASES

Recent information indicates that there are no new M1903 or M1903A1 .30 caliber rifles available for purchase through the DCM. Those which are obtainable are reconditioned and in serviceable condition.

The DCM is very appreciative to those individuals who have written in advising that the rifles received were not in new condition. Arrangements have been made whereby individuals who have received rifles purchased at the prices given in the price list dated January 1, 1946, and have not found them in new condition, may exchange the rifle (if it has not been altered) for one in new condition. Each case is being handled individually.

Shipments of powder and ammunition components are still subject to delay. These delays may continue for some months, but at a diminishing rate as the supply catches up with demand.

The primers for the .45 Colt automatic pistol cartridge case now available through the DCM are either of Frankford Arsenal manufacture or of commercial manufacture. The F. A. primer and the commercial primers have different diameters and are not interchangeable. The F. A. primer is the smaller of the two and fits cases stamped "F. A." on the head. When the present stock of commercial primers is exhausted, only primers manufactured at Frankford Arsenal will be available.

Requests for Field Manuals, Technical Manuals, and similar military publications should be sent to the Superintendent of Documents; not to the DCM. Address such requests to: Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

The attention of all purchasers through the DCM is directed to the fact that the current NRA membership card should be attached to all purchase orders. Orders continue to arrive without NRA membership cards, or with cards which have expired prior to receipt in the DCM office.

The volume of mail handled by the DCM has increased to over 20,000 pieces a month. Because of this, and the limited personnel on duty, delays in processing purchase orders are inevitable. Orders are being handled in order of receipt at the DCM office. All purchasers are urgently requested to refrain from unnecessary correspondence.

STOLEN GUNS

One .22 caliber Model E Hi-Standard automatic pistol #82946, 4½-inch barrel, thumb rest whittled off grip. Removed from foot locker of returning serviceman en route from Fort Lawton, Washington to Cartersville, Georgia, between November 12, 1945 and February 14, 1946. $25.00 reward for return. Lucius Hannon, Jr., 2245 Laurel Avenue, Beaumont, Texas.

One 8 x 1⅛" Fecker Scope #7603. Lost or stolen from the shipping box while in transit in U. S. mails between Brightwood, Oregon, and Paoli, Pennsylvania. Notify Winton M. Bouray, Brightwood, Oregon.

One Colt M199 .45 caliber Officer's Model pistol #15-9702. Frank J. Baros, 1311 West 25th Street, Minneapolis, Minnesota.

Five .22 caliber Winchester Model 45 Target Rifles, #31389, #29939, #32779, #32819, #31176; one Remington Model 513T #79728. Communicate directly with the National Rifle Association.

One miniature pearl-handle revolver and one Sharps four-barrelled pistol #14443, revolving hammer, Patent 1859 by C. Sharp & Co., Philadelphia. Stolen from the Nevada State Museum, Box 616, Carson City, Nevada.

COMING EVENTS

The four classes of registered tournaments are indicated as follows: AA—National Matches; A—Regional; B—State championships and large district matches; C—Local. Classification of competitors for prize awards is indicated by an asterisk beside code letter (C*).

California (C*), May 10—Tamalpais Revolver Club Gallery Pistol Tournament, at Alto. H. O. Peters, 706 Third Street, San Rafael.

Texas (B*), May 11, 12—Southwestern Small-bore Rifle Tournament. V. A. Moore, 208 North Akard Street, Dallas.

Ohio (C*), May 11, 12—Eighth Annual Spring Rifle Match. H. W. Meiser, 621 Seventh Street, Marietta.

Pennsylvania (C*), May 12—Blair County Gallery Pistol Championships, at Altoona. C. J. Code, 919 Penn Street, Hollidaysburg.

Michigan (C*), May 12—Peach Blossom Rifle Match. James Jefferis, Stevensville.

Pennsylvania (C*), May 12—Tenth Annual Spring Small-bore Rifle Tournament. Alfred M. Newhard, 111 East Susquehanna Street, Allentown.

New York (C*), May 12—Spring Gallery Rifle Matches. A. H. Chasick, 1296 Sheridan Avenue, Bronx 56.

California (C*), May 12—Far West Small-bore Tournament. Jack Cornell, 662 Arden Avenue, Glendale 2.

Tennessee (B*), May 18, 19—Tennessee State Small-bore Tournament. A. W. Nine, 104 Underwood Place, Knoxville.

Oregon (C*), May 19—Small-bore Rifle Match. John R. Porter, 2452 N. E. 51st Avenue, Portland 13.

Colorado (C*), May 19—Izaak Walton League Pistol Tournament, at Englewood. Mrs. Gladys Baxter, 2600 South Fillmore Street, Denver 10.

California (C*), May 19—Southern California Pistol & Revolver League. Jack E. Cornell, 662 Arden Avenue, Glendale 2.

Arizona (C*), May 19—Small-bore Rifle Match. Howard Johnson, 936 East Van Buren, Phoenix.

Pennsylvania (C*), May 19—Annual Philadelphia-Area Spring Small-bore Tournament, at Cold Point. Gustave A. Irlenborn, 502 Lorraine Avenue, Oreland.

New York (C*), May 19—12th Annual Hudson Valley Small-bore Championship. Charles H. Smith, Box 1009, Poughkeepsie.

California (C*), May 19—San Francisco Police Department Monthly Pistol Tournament, at Lake Merced. Emile Dutil, 324 16th Avenue, San Francisco.

Wisconsin (C*), May 19—Fourth Annual Gallery Rifle Tournament. Raymond L. Schmidt, 1571 South 29th Street, Milwaukee 4.

Texas (C*), May 19—Austin Rifle Club Spring Pistol Tournament. S. M. Willbanks, 715 Littlefield Bldg., Austin.

Georgia (C*), May 19—Pistol & Revolver Matches. B. L. Abbott, 534 East Spring Street, Gainesville.

Texas (B*), May 25, 26—Southwestern Pistol Tournament. A. C. Cantrell, Police Department, Dallas.

Ohio (C*), May 25, 26—First Annual Ohio Valley Rifle Championship. Mrs. Betty Vandeveer, 8000 Hamilton Avenue, Cincinnati 31.

Michigan (C*), May 26—Southeastern Spring Rifle Tournament, at Wyandotte. Ervin Brehm, 3813 Brewster, Dearborn.

New York (C*), May 26—Metropolitan Rifle League Outdoor Championship & Gillies Trophy Tournament. V. B. Cleaver, P. O. Box 356, Hicksville.

Georgia (C*), May 26—Small-bore Rifle Matches. B. L. Abbott, 534 East Spring Street, Gainesville.

Maryland (C*), May 26—Western Maryland Rifle Championship. Harry Morgan, 141 Frost Avenue, Frostburg.

New York (C*), May 26—Rochester Rifle Club Small-bore Tournament, at Canandaigua. Olin G. LeRoy, 3 Bernice Street, Rochester.

Illinois (C*), May 26—Spring Rifle Tournament. Robert Jordan, 50 Waukegan Road, Deerfield.

Pennsylvania (C*), May 30—Kittanning Memorial Day Rifle Tournament. E. W. Cook, 926 Orr Avenue, Kittanning.

California (B), May 31, June 1, 2—California .30 Caliber Championships. Russ Wisler, 543 Clay Street, San Francisco.

Florida (C*), June 1, 2—Second Annual Southern Florida Spring Small-bore Championships. Dr. E. C. Barkley, 234 Chilean Avenue, Palm Beach.

Ohio (Unregistered), June 1, 2—Muzzle-loading Rifle Match. L. Niceswanger, 1001 Third Street, Marietta.

New York (C*), June 1, 2—Spring Pistol Tournament. V. B. Cleaver, P. O. Box 356, Hicksville.

Pennsylvania (C*), June 1, 2—11th Annual Small-bore Rifle Tournament. Charles W. Senseman, 425 South 13th Street, Harrisburg.

District of Columbia (B*), June 1, 2—District of Columbia Pistol Championship. Pvt. Charles L. Wright, 1700 Rhode Island Avenue, N. E., Washington 18.

TOURNAMENT REVIEWS

In preparation for the 1946 Marine Corps Matches, the Pacific Division competitions were held in Pearl Harbor, February 25 through March 2. PFC John W. Dempsey, of the Second Marine Division, fired a 555x600 with his M-1 to win over 296 rifle competitors. Winner of the pistol competitions was CWO Edward V. Seeser who, firing the service pistol twice over the National Match Course, scored 532. Sergeant John G. Jones, Dundalk, Maryland, scored 554 to take second place with the rifle; his 520 with the pistol won fourth place in that competition. Second to Seeser in the pistol match was Lt. Col. Robert D. Moser, Rupert, Idaho, with 526. One hundred and thirty-five officers and men are now enroute to Quantico to compete against other divisional winners for the Marine championships.

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At the February Gallery Tournament of the Conestoga Rod and Gun Club held in Richboro, Pennsylvania, J. Maxwell won two of the aggregates. Second and third to him in these were J. Williamson and M. Cottrell. Cottrell won the third aggregate, Maxwell placed second and J. Williamson third.

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There were 157 registrations in the 21st Annual Ohio Gallery Championship Matches, held at the Olentangy Village Range in Cleveland on February 22 and 23. W. C. Kimes, of Canton, won the Prone, metallic sights, match with a 300 possible. The metallic sights, Prone, Kneeling, Standing match was taken by Roy Flowers, of Cleveland, with a 288. The Columbus Trophy awarded to the winner of the any sights, Prone, Kneeling, Standing match went to Earl Rinck, of East Alexandria, for his score of 290. John Turnbull fired 188 to win the Offhand Match. Jean Brewbaker, of Akron, won the Women's Championship with her aggregate of 578. Joe De Hays, of Findlay, scored 298 Prone and 273 Prone, Kneeling, Standing to win the Junior competitions.

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Michael Balestrieri may have won the Metropolitan Rifle League's 100-Yard Championship, but Harold Walcoby was awarded M.R.L.'s Vice President Leonard Miller's prize for thirteenth place, a hat. Jack Lacy and Lew Weatherbee scored 400-29x to win the Doubles Match in this competition held February 23 and 24 in Brooklyn, N. Y.

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The Valley Stream Central High School, of Nassau County, N. Y., pulled an upset when they fired 904 to beat the Far Rockaway Team's 901 in the Long Island Daily Press Invitation Rifle Tournament, February 12, in Jamaica, N. Y.

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On March 3 the Elgin Rifle Club held its Third Annual Gallery Rifle Tournament in

Elgin, Illinois. Breaking a year's retirement from the shooting game, Dudley Steen borrowed a rifle and won three first places, but Oliver Lehman came up with the top aggregate score of 576. Second place and the Iron Sight medal was taken by Stephen Bornslaeger, of Milwaukee, who also scored 188 to win the offhand match. Byron Putnam was third in the aggregate with 572.

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A Class "C" Pistol Tournament sponsored jointly by the Broomall and West Chester Rifle and Pistol Clubs was held in West Chester, Penna., on March 17. James Chapman fired the winning 186 in the .22 Slow Fire event. CWO C. A. "Smitty" Brown scored 191 to win the .22 Timed Fire; he also won the Grand Aggregate and the .38 Aggregate. George Matthews won the .22 Rapid Fire match with 189. Chapman was winner of the .22 Aggregate. The .38 Slow Fire match was won by Merton Golden's 182, who also was first in the .38 Timed Fire competition with 193. Sharpshooter George Zimmerman, of Sparrows Point, Md., won the .38 Rapid Fire match, scoring 186.

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Juniors won 23 of the 52 awards made at the Second Annual Spring Small-bore Gallery Rifle Tournament held in Upper Darby, Penna., on March 16. Arthur Cook, a Junior from Washington, D. C., won second place in one match and first in the other six on the program.

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The San Francisco Police Pistol Tournament for March was won by Inspector J. Ahern, of the San Francisco Police, who turned in the aggregate score of 1043. Second to him with 1037 was A. Flocchini. Expert D. Harkelroad went clean with four first places in that class for the day's shooting, as did M. Pope in the Sharpshooter class. Their aggregate scores were 1036 and 1027. D. C. Dillon's 959 won the Marksman class.

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The Metropolitan Rifle League held the first Registered Gallery Rifle Match in the Metropolitan area on March 23 and 24, in Mount Vernon, New York. There were 108 competitors in attendance. Albert Wedgebury, of Paterson, N. J., won the match aggregate with a total of 571. Close behind was Charles Grollimund, a team mate of the Papco Rifle Club, with 570. Third place was taken by George Vanderbush, Jr., who scored 568.

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A new gallery record of 307 consecutive bulls was fired by Willis B. Miller in the 20 shots Prone at 50 feet, any sights match at the Oregon Gun Club's Fifth Annual Gallery Rifle Tournament, held March 24 in Portland. Larry Knox was second to Miller in this match with 131 bulls. Third was C. E. Keyes with 96. In the Junior event, Louis Leonard placed first, and Hubert Bartels second.

COMING EVENTS

(Continued from page 38)

New Jersey (B*), June 1, 2—Sea Girt Small-bore Championships. Charles J. Walter, 497 Cornell Street, Perth Amboy.

Pennsylvania (C*), June 2—Second Annual Spring Small-bore Championship Tournament, at Chester. Mary Jane Oster, 2800 Township Line, Llanerch.

Indiana (C*), June 2—Sixth Annual Spring Tournament. W. T. Woodall, 520 West 38th, Anderson.

Iowa (C*), June 2—Restricted Small-bore Rifle Tournament. G. G. Cooper, 816 Telephone Bldg., Des Moines. Restricted to Sharpshooters and lower.

Michigan (Junior), June 9—Junior Outdoor Rifle Match. Clayton D. McNeil, 219 Superior, Wyandotte.

Iowa (C*), June 9—Fourth Annual Mississippi Valley Pistol Tournament, at Muscatine. Carl Prevratil, 2018 West Tenth Street, Davenport.

New York (C*), June 9—Small-bore Rifle Tournament. Earl H. Matteson, Oneida.

Maryland (C*), June 9—Victory Small-bore Rifle Tournament, at Rossville. James Ambrose, 615 E Street, Sparrows Point. Limited entries.

Wisconsin (C*), June 9—Milwaukee District Small-bore Matches. Oliver Moody, 5527 North 35th Street, Milwaukee 9.

Illinois (C*), June 9—Spring Pistol Tournament. Robert Jordan, 50 Waukegan Road, Deerfield.

Washington (C*), June 9—Buddy League Pistol Tournament. W. F. Day, Police Headquarters, Seattle 4.

Minnesota (C*), June 9—Class "C" Rifle Tournament. Art M. Jenson, Albert Lea.

Alabama (B*), June 15, 16—Eighth Annual Alabama State Championship Small-bore Tournament. J. D. Clem, 315 South 70th Street, Birmingham 6.

Maryland (B*), June 15, 16—Seventh Annual Maryland Revolver & Pistol Championships. Chief Marcus H. Miles, % Police Department, Sparrows Point.

Oklahoma (B*), June 15, 16—Magic Empire Rifle Tournament. Mrs. H. T. Engelson, 224 South Allegheny, Tulsa.

California (B*), June 15, 16—Western States Rifle Championship. C. DeWitt, 3701 Lincoln Avenue, Oakland.

California (C*), June 16—San Francisco Police Department Monthly Pistol Tournament, at Lake Merced. Emile Dutil, 324 16th Street, San Francisco.

New York (C*), June 16—"Father's Day" Small-bore Rifle Match. V. B. Cleaver, P. O. Box 356, Hicksville.

Pennsylvania (C*), June 16—Lehigh Valley Summer Small-bore Rifle Tournament. Alfred M. Newhard, 111 East Susquehanna Street, Allentown.

Illinois (C*), June 16—Small-bore Rifle Tournament. Byron Putnam, 814 Ellis Avenue, Wheaton.

Oregon (C*), June 16—Outdoor Rifle Tournament. Herb T. Brown, 3818 N. E. Shaver Street, Portland.

Colorado (B*), June 16—State Small-bore Rifle Matches. L. F. Markle, 1006 Olive Street, Denver 7.

Missouri (C*), June 16—Small-bore Rifle Tournament. H. Winston McClure, 7046 Dale Avenue, St. Louis 17.

Ohio (B*), June 22, 23—Small-bore Rifle Tournament. Virgil G. Bruner, 543 Cedarhurst Avenue, Dayton 7.

California (B*), June 22, 23—California State Pistol & Revolver Championship, at Glendale. Russ Wisler, 543 Clay Street, San Francisco.

New York (B*), June 23—New York State Championship Pistol Matches. O. E. Whitbeck, 122 Morris Street, Albany.

Pennsylvania (C*), June 23—Annual Mid-Summer Small-bore Tournament, at Cold Point. Elwood Hartzell, 463 Cosgrove Street, Philadelphia 44.

New Jersey (C*), June 23—Northern New Jersey Small-bore Championship, at Midvale. John Berger, 447 Kearney Street, Paterson.

New York (C*), June 23—Annual Spring Small-bore Tournament, at Breesport. Clyde T. Curren, 252 Home Street, Elmira.

Oregon (B*), June 23—Registered Pistol Tournament. John S. Altmanns, 405 North Stanton Street, Portland 12.

Florida (A*), June 28-30—Southeastern Regional Pistol Tournament. John Harger, 1704 North "A" Street, Tampa 6.

Texas (B*), June 29, 30—21st Annual Texas State Small-bore Matches. John F. Callan, University of Texas Press, Austin.

Iowa (B*), June 29, 30—Open Small-bore Rifle Tournament. G. G. Cooper, 816 Telephone Bldg., Des Moines.

Ohio (C), June 29, 30—Tusco Eighth Annual Small-bore Tournament, at Uhrichsville. Carl E. Eichel, 123 East High Avenue, New Philadelphia.

Indiana (C*), June 30—First Annual Dunes Riflefest. Miss Waunelia S. Heise, 333 Warren Building, Michigan City.

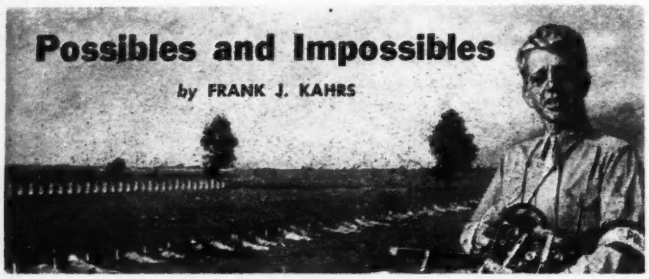
Michigan (B*), June 30—Annual State Pistol Matches. R. V. Gray, 2700 Overhill Road, Jackson.

Pennsylvania (C*), June 30—Small-bore Rifle Tournament. James Musgrave, 452 Clay Street, Rochester.

A PAPER FOR PEOPLE WHO SHOOT

Rifle

VOL. 9, NO. 5 BRIDGEPORT,



When we look back over the years in retrospect and try to remember some of the outstanding performances of marksmanship with the rifle on the range, we find it a bit difficult to arrive at any definite conclusion, mostly because there are so many to choose from. This is particularly true of the 22 field.

We are frequently asked what we consider the most outstanding performance with the 22 target rifle. Frankly, we don't know. When you try to evaluate each of the many fine records made in competition down through the years, and place each on its proper pedestal in the rifle shooting Hall of Fame, you become conscious of the staggering and difficult job before you. We have personally seen most of the records made with the 22. We still don't know.

We have also been asked, "Who is the outstanding small bore shooter in the country?" We think we know the answer here.

Now about Military Rifle Shooting. Here again, we run up against the same thing. It's a pity someone doesn't compile the data in readable form and in such a manner to enable the reader to form his own opinion. Of course, many important details of each performance must be considered, but mostly the conditions under which the shooting was done . . . the target equipment, weather, etc.

For instance, let's take the Wimbledon Cup Match at Perry. Remember how many times this historic trophy was won by a shooter on the first relay at 7:30 in the morning? We do and we believe the record for this match was by a shooter in an early relay. I don't wish to detract one iota from the performance because ability to hold and squeeze is still of paramount importance. But add that 3 o'clock wind that zipped across the range at Perry from 9 A. M. on and you old-timers will know what I mean.

I remember back in 1912 when the Marines had their biggest year in rifle shooting. They made and broke records hourly; beginning at Wakefield, Mass., continuing at Sea Girt, N. J., and winding up the greatest year in American rifle shooting history at Camp Perry. Those records still stand.

But I do remember one incident that impressed me at the time. A Marine had been making a continuous run of bulls at 500 yards. He had been shooting at 500 yards for a couple of hours and the gallery was wondering how long any human could stand such grueling punishment. Finally, the team captain halted the firing and ordered the Marine off the firing line. He was mighty proud of his man.

We asked him afterwards why he did not let the man continue his record shooting. His answer was, "I was afraid he would permanently injure himself." That made sense. We also remember noticing his wrist where the sling rested. It was black and blue and bruised. It was a great bit of shooting and a test of endurance that is seldom matched.

* * *

The rifle shooting boys in Florida have had a busy winter indoor season and we note particularly that the boys over in Palm Beach have been very active.

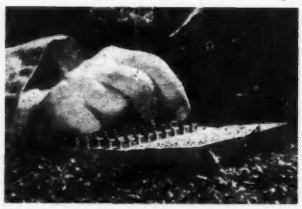
In one match, recently, they set down what they call a "plinking" rifle match. This is fired at any time there is a lull in activities. Say, for instance, when the office is working on final bulletins, then they set up a 100-yard rapid-fire silhouette target to be fired at 50 yards and in the standing position.

The match consists of 20 shots, fired in four stages of 5 shots each, one minute being allowed for 5 shots. The range officer announces the passage of time at 15, 30, and 45 seconds. The shooter may use metallic sights and extend his left arm, Army style, of course. The entrance fee is 25 cents and the shooter gets back all the money. We need more matches like this to fill in with.

REMINGTON AMMUNITION

HERE'S HOW ACCURACY IS BUILT INTO REMINGTON AMMUNITION

BRIDGEPORT, CONN., May, 1946. Accuracy standards of 22 rim fire ammunition have soared in the past decade. Today's match loads—Remington Palma Kleanbore and Police Targetmaster—shoot groups that would have seemed unbelievable only a few years ago.



Constant analysis of raw materials, constant searching for new and improved manufacturing methods, constant checking and rechecking, checking ammunition in every stage of manufacture assures you the highest quality and superior performance—shot after shot. New lots of Palma Kleanbore and Police Targetmaster are available in limited quantities. Be sure to try them!

"IF IT'S REMINGTON IT'S RIGHT"

Palma, Kleanbore, and Targetmaster are Reg. U. S. Pat. Off. by Remington Arms Company, Inc., Bridgeport 2, Conn.

AROUND OUR CLUB . . . Happy Days Ag

TO THINK FOR 4 YEARS WE HAD TO "SWEAT-OUT" EVERY SHOT!
GOLLY! THIS REMINGTON AMMO REALLY GROUPS!
I THINK IT'S EVEN BETTER THAN BEFORE THE WAR!

Remington News

WEATHER:
FAIR & WARMER
FOR HOT SCORES

...CUT, MAY, 1946 — First Class Reading Matter for Rifle Shooters

...ARGETMASTER' & 'PALMA'
...S AVAILABLE ONCE AGAIN!

ACCURATE AMMUNITION THAT CAN'T BE TOPPED

STEP UP YOUR SCORES WITH REMINGTON MATCH CARTRIDGES

BRIDGEPORT, CONN., May, 1946. Here's good news for target shooters! Those two favorites—Remington Police Targetmaster and Palma Kleanbore—are back in limited quantities. And as production increases, no longer will you have to ask yourself, "What kind of ammunition will I shoot in the next match?" Because you just can't go wrong on these two dependable standbys!

"Palma Kleanbore"

Once more you can enjoy the thrill of using Palma Kleanbore and seeing your shots zip into the X-ring. When you settle into position, take a deep breath, know that every shot has to be dead-center, it's good to know that you're shooting Palma Kleanbore again. The matches won with this ammunition are the surest proof of the results you get with Remington Palma Kleanbore. For years, Palma Kleanbore has been top choice at the biggest small bore matches And this year, indications show that it will be an even greater favorite.

"Police Targetmaster"

Match competition among rifle and pistol shooters demands the utmost in accuracy. The ability of the shooter to score extremely tight groups must be equaled by the perfection of the ammunition. Rifle and pistol shooters who have used Police Targetmaster know the dependability of these cartridges and appreciate how they have contributed their share to the winning of many important matches.

DOPE BAG

Conducted by Major General J. S. Hatcher
Edwards Brown, Jr., A. H. Barr, J. L. Murphy, J. S. Rose

THIS MONTH:

Muzzle Covers · Enfield Remodeling · Nose-Drilled Bullets · Another Pistorifle · Cleaner and Preservative · Cleaning Lenses · IMR 4895 Powder · Sighting Scope Principles · Cleaning Solution · Lead Alloy Bullets · Little Joe Dot · Case Forming and Reloading · .257 Roberts · Winchester Research · Trade Dope

MUZZLE COVERS

Mr. Wm. F. Schutte of Harrisburg, Pa., asks: Would it be safe to put a piece of cotton gauze over the end of the barrel to prevent snow and twigs from entering? Would the gauze run up the pressure and make it as dangerous as snow and twigs?

Note. I do not see how a piece of cotton gauze over the outside of the muzzle could cause you any trouble.

Around about 1922 while I was stationed at Springfield Armory I designed a spring steel muzzle cover and sight protector made to snap on over the front sight stud of the M1903 rifle. This was adopted by the Army and was an article of issue for some years.

Before approving this article for issue we experimented by firing rifles with these spring steel covers in place over the muzzle to see if any trouble would result if the soldier did the same thing by mistake. The bullet simply pierced the cover and went on its way with little or no apparent change in velocity; and the muzzle blast then blew what was left of the cover off the muzzle. Careful visual inspection as well as measurements by means of the star gauge failed to show any bulge or enlargement of the bore or any other damage.

During the recent war it was standard practice to leave the muzzles of aircraft guns covered with a cap made of plastic, to keep snow and ice from getting in the muzzle at high altitudes. Experiments were made letting ice build up on these plastic caps, which were then shot off with regular loads. No guns were blown up and no rings were left in the muzzle.

On the other hand, if a ball cartridge is fired in a gun which has an obstruction of any kind inside the barrel, it is almost certain to cause a ring or bulge or it may even split the barrel wide open.

This is because an obstruction inside the barrel will check the bullet, and the gas following at high velocity will be stopped suddenly and will then spread out and expend its dynamic energy in a sidewise direction, causing the bulge or split.

Even a very light obstruction inside the barrel can cause this effect by wedging between the sharp point of the bullet and the walls of the barrel.

On the other hand, this same effect does not occur, at least to any noticeable degree when a cartridge with powder, but no bullet, is fired in an obstructed barrel. For many years the Army used rifle grenades having a steel rod attached to the base of the grenade which extended some inches into the barrel of the rifle. These grenades were projected by means of a blank cartridge. I made a number of tests of these grenades and found that after repeated firing there was a tendency for the bore to enlarge slightly just at the point where the end of the rod rested in the bore when the cartridge was fired.

I made a number of experiments to determine whether or not stuck bullets or other obstructions in the bore could be removed by taking out the bullet from the cartridge and then firing the cartridge containing the powder charge, (but no bullet), in the obstructed barrel. In most cases the obstruction was successfully removed this way and the barrel showed no change or damage. However, in one or two cases we thought we detected a very slight enlargement of the bore right at the point where the obstruction, which in this case was a bullet, had been located.

During the course of these experiments we once had a cartridge fired in this manner which failed to dislodge the obstruction and the compressed gas remained in the bore of the rifle. The pressure on the bolt was such that it could not be opened by hand. The bolt handle was pounded up with a mallet; when it reached the fully raised position the bolt was driven back violently and the case was ejected with a loud report. A heavier charge was then used and this time the obstruction was blown out.

Please bear in mind that these experiments were conducted in the proof room at Springfield Armory with the rifle in a fixed rest and with everything carefully controlled as to safety so that there was no chance of having anyone injured. I certainly do not recommend similar experiments under any other conditions.

To sum up, my experience indicates that gauze on the outside of the muzzle will cause you no harm even though ball ammunition is fired through it.—J. S. H.

ENFIELD REMODELING

We received the following question: "Would like to have some information on the conversion of the Enfield bolt to cock on the opening stroke. I know this is a job for a gunsmith, but I have made about every conversion except this one on the Enfield and would like to try it (on my own gun, of course)."

Note: In changing over the M1917 Enfield bolt to cock on the opening motion of the bolt handle, you first turn up a close-fitting carbon rod for the bolt barrel or to replace the bolt sleeve. Electric welding might be best, but a gas torch can be used if one is careful. For the latter, at least, it probably is best to turn the bolt upside down, half submerged in a pan of water, so the extracting cam on the left side of the bolt is kept cool. Then lay a cloth over the forward part of the bolt so both ends are in the water. The cloth is kept wet to keep heat from reaching the locking lugs.

Next, the bolt must be filled in at the rear end on the bottom side to extend the cocking surface to the extreme back end of the bolt, similar to the Springfield and other rifles. This is done to cam the cocking piece clear to the rear end of the bolt barrel. The new notch after welding must be cut with an easy sweep from the deepest point to the rear of bolt barrel. As there is considerable wear at this point, tough steel should be used. This job should be attempted only by those having the skill and equipment to do a clean, smooth welding job, and be absolutely sure the forward part of the bolt is kept cool. That goes also for the cocking cam on the left side of the bolt.

Sometimes the Remington Model 30 cocking piece is used to replace that on the Enfield, but that is not a cure-all as the underside of the bolt body must still be built up by welding.—A. H. B.

NOSE-DRILLED BULLETS

A letter from J. G. Wilson of Du Bois, Pa.:

"For many years I have taken the 172-grain full-metal-jacket boattail bullet and drilled a one-sixteenth-inch hole in the forward end. I make this hole three-sixteenths of an inch deep. This hollow-point bullet opens up beautifully, is a splendid killer, and is, we all figure, perfectly safe. On account of the taper at the rear it would be impossible for the gas, emanating from the burning powder, to push the lead filler out through the jacket and leave the jacket in the barrel to cause trouble (and I mean trouble) on the following shot.

"Now I am using, or expect to use, four bullets in my Springfield rifle. The 109 grain and 110 grain in a load for small game; the 150 grain for deer, etc.; the 172-grain boattail for long, accurate shots at both large and small game; and the 220 grain for grizzly or brown bear (in case I have the opportunity to hunt them in the future). Now it is the 150-grain bullet (purchased from the Director of Civilian Marksmanship) that has me worried. What will a one-sixteenth-inch hole, three-sixteenth inch deep, do to this bullet? Due to the greater surface of lead exposed to the gas pressure, is there any danger of the lead in this bullet driving out of the outer casing and leaving the casing in the barrel? Did you ever hear of this occurring?

"And in case it should occur, don't you believe that this lead core would cause such a peculiar sound that the ear would immediately detect the fact that something was wrong? In other words the report would not be the natural one connected with that particular bullet and load.

"I have used the 150-grain bullet for thousands of shots without any trouble, but it was either the umbrella expanding (with solid base), or the full-metal jacket with the point unaltered.

"What is your opinion and is it based on something that actually happened?"

Note: I know that the good performance you have had with the doctored boattail bullet is common. However, some shooters insist that the 150 grain can be drilled at the point in the same way and be used safely. We do not recommend that practice because we know of several instances where the jacket was left in the bore. If you want to take that chance, however, be sure you inspect the bore after shots where you suspect that the bullet has gone wild. If you do this you should be perfectly safe in using the 150-grain flat base with a hole drilled in the nose. The danger is with the inexperienced shooter who might overlook the safety precaution.—A. H. B.

ANOTHER "PISTORIFLE"

Yellow pine, salvaged from packing crates, provided stock material for this latest gadget dreamed up by L. W. Merritt while he was on duty aboard the U.S.S. *Collingsworth*. He retained the ten-shot curved clip of the original .22 caliber Ranger rifle and cut the barrel to seven and a half inches from chamber to muzzle. The trigger guard, back strap, and stock ring were hand-formed in brass.

The old safety was retained when the trigger was moved well forward and linked to its old

position by a section of drill rod. Machine work was limited to shortening, rechambering, and cutting of extractor grooves in the old barrel.

The "Plinker," as Merritt calls it, was started in Manila, had its first proving ground experience in China, and later, when their ship was under way, the gun did a good job preventing empty tins from floating long after they had been discarded by leading convoy ships. He claims accuracy on five-gallon cans up to 100 yards.—J. S. R.

CLEANER AND PRESERVATIVE

The Associated Chemical Industries, 5410 Lee Highway, Arlington, Virginia, gave us, for trial, a thin, almost clear solution, No. 93-80. This they claimed was good for cleaning in addition to being water repellent and rust preventative. The first demonstration was rather impressive, cleaning an old, much-fouled Springfield barrel that had been lying around for about five years.

This No. 93-80 was the only cleaner and preservative used on our rifles during a seven-day deer hunt in foul weather, including plenty of rain and snow. We also used F.A. 70 primers and cleaned the bore only twice in the seven days. In this particular case, No. 93-80 did the job O. K., both inside and out. Further tests will prove whether this or any similar cleaner other than water or an oil-base water cleaner is safe to use after firing those chlorate primers.

In comparative tests this thin liquid protected polished steel fully as well as regular thin oil intended only as a preservative and not to be included as a cleaner. The severe brine test did not break down the protective coating until the sixth day and at the end of thirty days the failure was only along the edges of the thin steel test plate. At least 93 per cent of the surface was perfectly clean and bright after eighty days in the saturated brine solution. About 7 per cent of the surface was etched but no deep pits were present.—A. H. B.

CLEANING LENSES

The Optical Coating Laboratory of Washington, D. C., has provided us with the following information on the cleaning of lenses:

Of the large quantity of fine optics that come in here to be coated, we find an exceedingly large number of scratched elements. Most of them are so fine that their owners have not noticed them. Coating the lenses brings these scratches out plainer because of the reduction of the surface reflection.

We believe a word of caution should be given here as to the cleaning of the lenses. Contrary to belief, it is not necessary or desirable to clean a lens as often as most people think. When not in use, keep the lens covered with a lens cap. Dust is the most troublesome on a lens surface. Do not wipe it off with a dry cloth or lens tissue. Blow it off. Some dust particles are nearly as hard as diamonds and can easily scratch the glass. If you do use a camel's hair brush, clean it first in ether. A brush touched by the fingers is not clean and upon lying around it will accumulate dust.

The simplest way to remove fingerprints, etc., is to first blow the dust off the lens. Moisten the end of a clean handkerchief with saliva or blow your breath on the lens and wipe it off immediately, drying the lens with a dry section of the handkerchief or lens tissue. Care must be taken that the dust is removed first and that only the softest and cleanest cloth or cotton is used.

There are numerous solutions that will effectively clean a lens, even commercial window cleaners if they are carefully used. Use a swab of cotton on a pointed stick of wood moistened slightly with one of these solutions or use a solution made of one part water to four parts pure ethyl alcohol. If great care is taken you can use pure acetone. Swab the lens in circular motions from the center to the edge. The swab should never be wet enough to allow the solution to flow over the lens. It may seep around the lens and cause the balsam to separate. It should immediately be dried with a dry swab to prevent water stains remaining on the lens. Never dip the swab into the solution a second time. Use a clean swab each time.

This procedure is applicable for coated and uncoated lenses.

IMR 4895 POWDER

Fred Whitlock of Rockford, Illinois, likes the IMR 4895 powder which is being sold through the Director of Civilian Marksmanship. His tests were made with the 150-grain service bullet in the .30-'06. Fred is an experienced shooter. He was recently on duty as a Major in Army Ordnance Department and stationed at the Aberdeen Proving Ground. Here are his comments and the dope he has furnished us.

"This IMR 4895 (lot 24664) is something I had never expected to see and as far as my shooting goes it is the one and only powder for me.

Form of Grain	cylinder
Number of perforations	1.
Length of grain	0.060 inch
Diameter of grain	0.053 inch
Diameter of perforate	0.0071 inch
Thickness of web	0.0130 inch

Charge Grain	*Pres psi*	*Muzzle Velocity f/s*
36.0	12,500	2,000
45.2	29,000	2,500
47.0	32,300	2,620
48.9	35,800	2,710
50.7	39,000	2,800
52.5	42,000	2,900
55.0	46,600	3,060
58.0	52,000	3,230

These values are taken from the curves and are considered to be well within experimental tolerances. I have used the above loads and find the 55- or 58-grain charge to be the most accurate and one of forty-three grains the most pleasant to shoot. I have often fired 150 rounds in an afternoon without a pad and nothing to show for it on my shoulder."

Note: As Fred says his results were obtained with lot 24664. There may be a two- or three-grain difference between individual lots of the same type powder. Charges of over fifty-three grains of this powder in the various lots should be approached with caution.—E. B.

Reborn: Leland Knight submitted the photograph below of his beautifully renovated Winchester Low Side Wall, .22 caliber, single shot. He received it as a "sorry looking mess" which had occupied an attic for years, but it recovered nicely with a new stock, barrel, and blue job. The stock appears to have been made from one of those "fine maple blanks" he described.

SIGHTING SCOPE PRINCIPLES

We have been receiving several questions in regard to sighting scopes. The following information is intended to clarify some of the elementary problems connected with scope design. Do not attempt to design a scope from the data given here as the figures shown are only approximate and are "rounded off" to even numbers, as far as possible, for ease of explanation. The diagrams illustrate the fundamental principles of the general types of scopes and how fundamental changes affect the characteristics of a scope.

Individual manufacturers' designs of scopes differ in many ways. Some may place the reticule at the focal length of the objective and others at the focal length of the eyepiece. Instead of one lens at the position of the inverter or the ocular, there may be a system of lenses. Most lenses will be the compound achromatic type with other aberrations reduced to a practical minimum. A compound lens consists of two or more dissimilar elements which may or may not be cemented together. An achromatic lens corrects for chromatic aberration. Chromatic aberration is illustrated in Fig. 4 and the means of correction in Fig. 5. These refinements and individual designs, while they may improve the qualities of the scope, do not alter the fundamental characteristics illustrated here. Figures given on the diagram such as exit pupil diameter, are representative of an average scope, Everything else being equal in two scopes, one may have a slightly greater exit pupil diameter or slightly larger field of view, but the fundamental principles, or laws of optics, place definite limitations on the performance of a scope. Consequently, it is hardly possible to design one scope with characteristics which fulfill the requirements for all types of shooting.

When we increase the power of a scope, we decrease the field of view and illumination. For a scope of a given power, increasing the area of the objective lens will not increase the field of view. A feature which usually limits the field of view for scopes of a given power is a diaphragm in the scope through which the rays must pass. The diaphragm is placed in the focal plane of the objective lens and is projected upon the object in the same manner as the reticule is projected. The purpose of the diaphragm is to eliminate the outer fringes where it is difficult to correct for aberrations. The true field of view of a scope is represented by the maximum angle at which rays can enter the scope. The apparent field of view is represented by the maximum angle at which rays can leave the scope at the eyepiece. The apparent field of view is generally limited by the optical possibilities of the eyepiece. A common, practical apparent field of view is thirty-five degrees to forty degrees, but more is possible. In a simply constructed eyepiece, the apparent field may be only twenty-five degrees to thirty degrees. The magnification of the scope can be determined by dividing the true field angle by the apparent field angle.

Increasing the objective size up to a certain point increases the amount of light coming to the eye. When the objective lens is enlarged to the point where the emergent beam fills the pupil of the eye, no further increase in illumination can be obtained by further enlarging the objective. This is illustrated in Fig. 4 where the exit pupil diameter is larger than the pupil of the eye. This practical limit differs for day and night scopes because at night the pupil of the eye will usually dilate to a diameter of six millimeters to seven millimeters. During the day, however, the pupil of the eye is dilated to a diameter from 2.5 millimeters to five millimeters.

The emergent beam, or pencil of light, is termed the exit pupil. Hold a scope so that the eyepiece is at arm's length from you and the scope pointed to an even source of light. You will then see the exit pupil in the form of an illuminated disc which appears to be in the center of the eyepiece or between the eye and the eyepiece. Another method is to hold the objective to the light and move a piece of paper back and forth behind the eyepiece until a clearly defined spot of light appears. With the paper and scope held in this relative position the distance between the paper and the eyepiece is the eye relief. The illuminated spot is actually an image of the objective lens and is what we have referred to as the exit pupil. The illumination or brightness of the image is dependent upon the diameter of the exit pupil up to the diameter of the pupil of the eye. A larger exit pupil cannot be obtained without increasing the size of the scope or decreasing the magnification. As in the case of scope Fig. 2, when compared to scope Fig. 3, the power in No. 2 is increased but the objective is enlarged as well. In this case, the one change partially compensates for the other as far as the exit pupil is concerned.

Figure 1—TARGET SCOPE

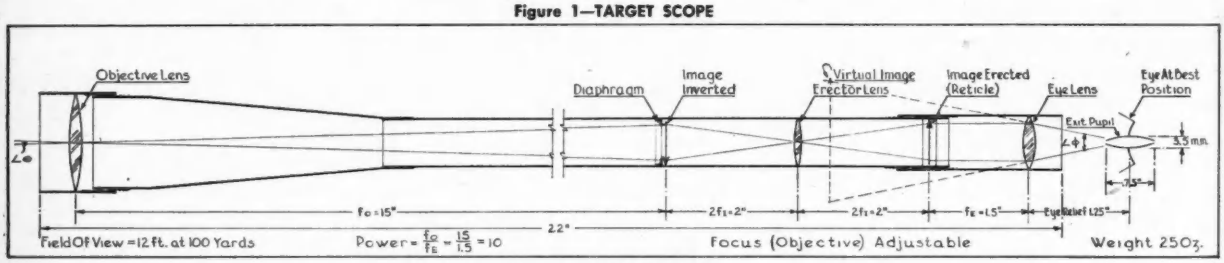


Figure 2—VARMINT SCOPE

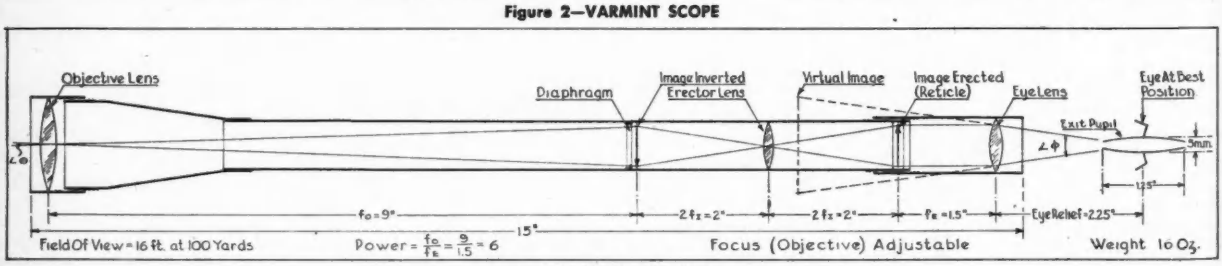
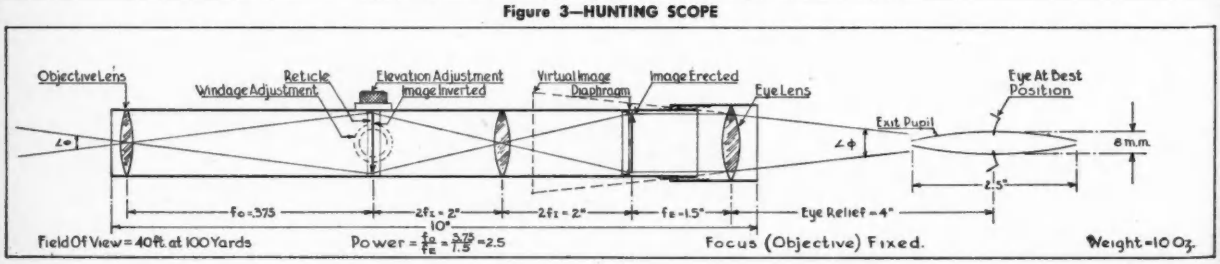
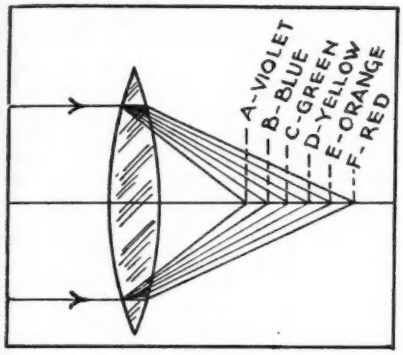


Figure 3—HUNTING SCOPE



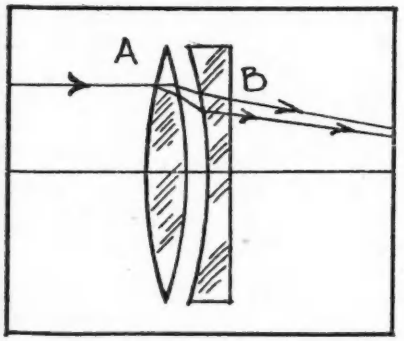
The eye relief distance is greater in the lower-powered scopes as shown in the drawings where scope Fig. 3 is given a characteristic 4-inch eye relief. This distance is more critical in the high-powered scopes. Scope Fig. 1 permits good vision of the entire field over a space of only .75 inch while scope Fig. 3 permits 2.5 inches.

The power of a scope can be determined by dividing the focal length of the objective lens (f_o) by the focal length of the eyepiece (f_e) providing the inverting system does not magnify. If the inverting system does magnify, multiply $\frac{f_o}{f_e}$ by the magnification of that system to obtain the power. Providing the diaphragm in a scope is not too great a limiting



factor, the power can also be determined by dividing the diameter of the objective lens by the diameter of the exit pupil. Another means of determining the power of a scope is dividing the apparent field φ by the true field θ. The apparent and true field angles are indicated on the accompanying scope diagrams by φ and θ respectively.

Referring to a table which was included in an article, "Telescoptics," by George R. Parizek: This appeared in the June, 1942, AMERI-



CAN RIFLEMAN. For those interested in actually designing a scope, I recommend that they find access to this article as well as to an article in the September, 1942, issue by the same author, titled "Working Telescoptics." One of the best texts on optics is a Government publication, "Elementary Optics," which used to be for sale by the Superintendent of Documents, Government Printing Office, Washington, D. C. They do not have any copies at the present time, but they should have a reprint in the near future.

If you want to go even deeper, you can obtain a nicely bound copy of "The Manufacture of Optical Glass and of Optical Systems" (Document No. 2037) from the Government Printing Office for $1.75. This latter publication goes into the subject a little deeper than most home fabricators of scopes want to go, however. The following can be purchased through the National Rifle Association: "Scopes" by F. C. Ness, 1940, 25¢; "Telescopic Rifle Sights" by Townsend Whelen, 1944, $2.00. —E. B.

CLEANING SOLUTION

The February, 1945, Dope Bag included a detailed description of how to make bullets using caliber .22 Long Rifle fired cartridge cases for bullet jackets. These bullets are referred to as R.C.B.S. bullets. The R.C.B.S. is a trade name and stands for Rock Chuck Bullet Swage.

The tools for turning out the R.C.B.S. bullets are made by the R.C.B.S. Company of 688 High Street, Oroville, California.

One of the problems involved in using caliber .22 cartridge cases is that of thoroughly cleaning the powder and primer residue from the inside of the case. We have just received a letter from Mr. A. L. Lewis of Montgomery, Alabama, giving us a new slant on how the cleaning problem can be whipped. He sent us a few of the cleaned cases which show evidences of a nice job.

Here is what he has to say:

"Here is how I clean my fired .22 hulls. It is so simple and fast it makes me feel foolish to think of the time I lost experimenting with various methods.

"There is a carbon solvent manufactured by the Magnus Chemical Co., Inc., Garwood, New Jersey. It is called Magnus 775. It is rather expensive. I think about $2.50 per gallon.

"It is used by automobile maintenance shops for decarbonizing and degreasing parts. It is also used at Government Air Fields for this same purpose.

"To clean the hulls, I add 20 per cent to 25 per cent water to the cleaner. I think 20 per cent does better. As I only make up 100 or 200 bullets at a time, I put the cleaner in a quart jar (about half full) put the 100 or more hulls in, and shake a little. Then I let it stand for fifteen or twenty minutes, give it another little shake, and pour the solution through a strainer into another jar. The next step is to take hulls to a faucet and rinse off the surplus solution, or they can be rinsed off in another jar by shaking. This is before deheading the hulls. I give them another bath in the solution after deheading.

"In large quantities, the hulls could be put in a basket made of screen wire and hung in a large open-mouthed jar. The cleaner has no surface tension and will instantly fill the cases. It is easily cleaned off with cold water. The company recommends heating the cleaner to about 150 or 160 degrees, but I find it not necessary for cleaning the hulls.

"What I have in mind in mentioning this is that probably lots of the shooters will want to continue making their own bullets. It will be a big help to use the above method."

LEAD ALLOY BULLETS

Those well-known Loverin bullets made up until several years ago will be available again but will come from another source. H. Guy Loverin informs us that he is turning his molds and bullet business over to Ralph McWilliams, 519 High Street, Clinton, Massachusetts. McWilliams, we understand, has been casting bullets for some of Loverin's old customers, who must be satisfied, as frequent repeat orders are received regularly. Loverin sends his own recommendation stating that McWilliams' bullets "will equal the product I put out." Enough said, as most of us know how those alloy bullets would shoot.—A. H. B.

LITTLE JOE DOT

We had one of our 330 Weaver scopes equipped with a "Little Joe Dot" by J. Z. Kurpiesk of Medford, Oregon. We requested fine cross hairs and a dot covering less than two minutes of angle and we got just that. It is just about right for use on small targets but the dot is too small for some purposes. It is hardly possible to make a compromise on a dot size which will be suitable for all purposes, but I believe that a two-to-three-minute-of-angle dot should be selected for use in the 330 Weaver and similar low-power scopes.

Minute of angle or smaller dot should be selected for scopes of six power or more. The Joe Dot is available, according to the maker, in any size with fine, medium, or coarse cross hairs. The dot we tried appeared to be round, sharp, and black.—A. H. B.

CASE FORMING AND RELOADING

Since mentioning that case-forming service by J. W. McPhillips in the February Dope Bag, samples have been received and they look very good and uniform. We understand also that the cases are ready for use with full loads, and thus fire-forming with reduced loads is unnecessary. They also have been annealed, a job that is usually necessary for long life, as shortening the cases eliminates the effect of the original neck and shoulder anneal. The shortened case then has a hard, brittle neck which will soon become cracked from resizing and reworking the brass, unless the neck is annealed.

McPhillips also does custom "Precision, Guaranteed" reloading. We have no more data on his loading service.—A. H. B.

CORRECTION

I was agreeably surprised to find my last letter published in the February issue of the AMERICAN RIFLEMAN in the Dope Bag under "A Fine .257 Roberts." I wish to make one correction to the published letter. The load given as ten grains of #3031 was of an entirely different powder. It was ten grains of Hercules #1301, a .22 hi-speed powder. I know that this powder is not available for handloaders' use, but gave it to show the type of powder that gave me the most accurate results. This load has made one-hole groups at ninety-six yards, which I have been unable to duplicate with any other propellent.—STANLEY D. MAYO.

TRADE DOPE

Ralph T. Davis of 805 North Long Beach Boulevard, Compton, California, formerly a supervisor in a large machine shop and more recently with Weatherby's Custom Sporting Goods, is now operating the Modern Gun Shop. He says that he is set up to build wildcats including the Magnums, as well as to repair, reblue and mount scopes.

* * *

10-X Manufacturing Company of 305 Eleventh Street, Des Moines 5, Iowa, writes that they are back again with their line of well-known shooting coats, jackets, and gloves. In about three months they expect to be in a position to offer 48-hour service in filling orders as was their former custom. They state that in the meantime they will take care of orders as promptly as possible and will acknowledge orders immediately, notifying the customer of a scheduled delivery date.

* * *

The Flintlock Antique Shop of Parker Court—off West Central Street, Route 135, Natick, Massachusetts, has mailed us a copy of their twenty-five-cent "Third Catalogue of Antique Arms." This lists an interesting variety of antique pistols, revolvers, rifles, and related collectors' curios.

WINCHESTER RESEARCH

I recently dropped in on Mr. Edwin Pugsley, of New Haven, Connecticut, and spent some time in his home looking over his firearms collection, one of the finest and most complete to be seen anywhere.

Mr. Pugsley, the well-known Director of Research of the Winchester Repeating Arms Division of Olin Industries, Inc., is a great believer in the value of scientific research and appears to be getting full support for his progressive policies. A visit to his Division gave me the impression and atmosphere of a big research laboratory in one of our larger universities. Besides the latest in oscilloscopes and other electronic apparatus, the splendid equipment included such items as superspeed motion picture cameras, high-power high-speed X-ray machines capable of photographing a bullet or a charge of shot at any point in its motion inside a gun barrel, special apparatus for measuring pressures at any point in the barrel or stresses in any part of the mechanism, as well as other new pieces of scientific apparatus which we are not at liberty to divulge at this time.

I had a most interesting talk with his research staff whose collection of Ph.D.'s and other degrees imparted confidence in their ability to get results and reduce them to practical applications.

Past progress in arms and ammunition design and manufacture had, of necessity, to be accomplished without the benefit of such scientific knowledge and equipment. This approach is opening up such fascinating vistas of knowledge that in Mr. Pugsley's words: "It is like coming out of a dark room into the sunshine. We are finding out so many new things that we are a little dazzled."—J. S. H.

John W. Smith of Rambler Avenue, Runnemede, New Jersey, has mailed us a copy of his new Price List No. 26 of Antique and Modern Firearms. He will mail a copy of this catalog for thirty cents.

* * *

The Bellport Gun Shop of Bellport, Long Island, New York, has mailed us a copy of their list of items for sale. This list includes, among other things, helmets, flintlocks, percussion pistols, military rifles, bayonets, and Nazi relics.

* * *

C. C. Johnson, gunsmith of Thackery, Ohio, is swamped with work and says he cannot accept any more orders for at least six months.

* * *

Miller Bedford, the gun trader of New London, Ohio, who likes to be called "Hosstheef" is out with his Number Seven list. It is now the "Bedford Bugle," but formerly the "Hosstheef Gayzette." The Number Seven list is about newspaper size and four pages listing nothing but guns and more guns, mostly antique.

* * *

Robert Westmoreland, operating The Gun Shop, Gresham, Oregon, is specializing in rebuilding Model 98 Mausers and M1903 Springfields. He has barrels, actions, sights, and stocks available.

* * *

Leland Knight of Huron, Ohio, sent in some nice photographs of his restocking jobs, one of which appears in the Dope Bag. He has available a stock of native wood blanks in different grades with "very nice" blanks in maple and "better" grades of walnut. Knight specializes in stock work but he is willing to do necessary alteration and blueing jobs for his restocking customers.

* * *

Robert S. Thomas, Silver Spring, Maryland, is now giving his full time to optical repair service after spending most of the war years making optical equipment for Uncle Sam. Cleaning and repair service, including lens coating service, is the present plan.

* * *

Gowen's "Gun Re-Blu Company" of Tampa, Florida, is changing its address May 1st to Fletcher, North Carolina, where they will occupy larger and more modern quarters.

* * *

The Optical Coating Laboratory has perfected a new "Electronic" process to "hard-coat" "spun-in" lenses without removing them from their cells or uncementing them. This process is done without the application of heat. Therefore, this should be of great interest to the owners of some high-quality camera and binocular lenses that are spun in their cells. They claim the hardness approaches "High-Temperature" processes and is equal to or better than the Government specification for hardness. Before this process, lenses mounted in such manner were considered impossible to hard-coat. They can be cleaned by any careful cleaning method. Excessive rubbing and cleaning seemed to have no harmful effect to the coating on sample lenses treated by the "Electronic" process.

* * *

Joe Goss, who has been designing and making many popular metallic sights for years now has a new address, Baileys Harbor, Wisconsin, and is announcing a new line of sights. We are told that the new line, priced from $4.75 to $12.00, has been in the development stage for about eight years. These sights are to be sold on a ten day, money back guarantee. More about these sights later as samples are on the way.

* * *

Speer Bullets. A rather complete variety of soft point bullets is planned by Vernon D. Speer of Lewiston, Idaho. Available at present or at a later date these bullets in caliber .22, .228, .25, .270, 7 mm., .30 and 8 mm. can be obtained through dealers for Speer bullets. Several dealers listed are J. W. Hornaday and Leslie Lindahl. See their ads for complete address. Listed as being available at present are the caliber .270 weighing 100 and 130 grains. The only other calibers on hand are the 130 grain 7 mm. and 170-grain 8 mm. We understand the very best gilding metal sheet obtainable is used to make these Speer bullets.

* * *

The E. C. Herkner Company is out with a side mount which appears to be quite satisfactory, judging by the sample we had an opportunity to look over. This moderately priced mount is furnished with proper diameter radius to fit most of the popular receivers. The first mounts available will be for the Lyman Alaskan to go on the Winchester M54 and M70 models. Also with the same scope for use on Remington M-30 and 720, Springfield M1903 and Enfield rifles. Later on the mounts will be made up for other scopes like the new Weaver K2.5 and all hunting scopes with three-quarter-inch tubes. Mount bases for the best Mausers and other foreign actions will be available only on special order.

* * *

Bill Kirsh, 1284 Sunset, Los Angeles, Calif., announces that he can now make delivery in any desired quantity of the half moon clip enabling the caliber .45 Revolver M1917 to use the caliber .45 auto. cartridge. He also writes that he can now make one week delivery on short action revolver jobs and reworking of caliber .45 auto. pistols for better accuracy.

* * *

Rust Inhibiting Products (Rig) has a new address: 5646 Lake Park Avenue, Chicago, Ill.

* * *

H. W. Kruse of Chicago, Ill., is now in partnership with Patrick Heffron. The business will hereafter be known as the American Sports. They announce that they now handle all phases of gun work, modern and antique.

THE ARMS CHEST

GENERAL REQUIREMENTS APPLICABLE TO CLASSIFIED ADVERTISING

1. Transactions Based on Good Faith: ARMS CHEST transactions are based on good faith and mutual satisfaction. Deliberate misrepresentation, disregard of usual business ethics or the attempt to circumvent these general requirements, when brought to our attention, will result in refusal of further advertising and might result in disbarment from the NRA in the case of members.

2. All Orders Subject to These Conditions: WE reserve the right to edit all copy to conform with our standards and to reject or discontinue any advertisement which we consider undesirable.

3. Who May Advertise: The ARMS CHEST is an open market trading post. Any individual or firm whose advertisement and methods of doing business meet our requirements may advertise their goods or services.

4. Rates: All advertisements must be accompanied by remittance. The rate is 15 cents per word including name and address—minimum charge $2.00.

5. "For Sale" Ads Must State Price: A specific price must be stated on all FOR SALE ads—except that the phrase "write for catalog" may be used when listing merchandise in quantities.

6. Blind Ads Not Acceptable: Box number or blind ads will not be accepted. Give your complete name and address, to insure prompt delivery of all mail or telegraph replies.

7. Firearms for Sale or Trade Must Be Defined: The *condition* of every gun (including essential parts) advertised for sale or trade, *must* be specified according to *NRA standards*, as follows: PERFECT—meaning factory condition; EXCELLENT—meaning new condition, implying negligible amount of use; VERY GOOD—meaning practically new condition, implying little use, with no appreciable bore wear and only minor surface scratches or wear; GOOD—meaning moderate use with some finish worn off, only moderate bore wear, with no pits and nothing worse than a little roughness in the bore; FAIR—meaning no parts missing necessary to use of gun, reasonable wear inside and out, nothing worse than minor pits in steel or stock, gun sufficiently accurate for hunting. POOR—meaning marred appearance and pitted or badly worn bore.

8. Non-Specific Phrases Barred: Phrases such as "highest" or "top prices paid," as well as any other so-called "auction-type" phrases are not acceptable. The terms "fair price paid" or "state price wanted" may be used.

9. "Outlawed" Firearms Defined: The sale of certain firearms is outlawed by Federal law unless handled by a Federally licensed dealer. These include machine or sub-machine guns; sawed-off rifles and shotguns with barrels of less than 18" and Mauser and Luger auto pistols *with holster stocks.*

10. Requesting Privilege of Examination: We *insist* that purchasers desirous of examining merchandise before acceptance request shipment by express C.O.D. with examination privilege. This procedure permits the purchaser to inspect the merchandise *in local express office* and authorizes the express company to return unsatisfactory merchandise at shipper's expense.

11. How to Count Numerals, Etc.: Groups of figures are counted as one word (example: .30-30, 250-3000, $150.00, $1.50). Abbreviations consisting of initials or single characters likewise are counted as one word (example: W. H. Smith; H. B., meaning heavy barrel; HP., meaning highpower). Hyphenated words are counted as two words (examples: 20-gauge, pearl-handled, no-slip).

12. Responsibility for Illegible Copy: Type or print advertisements plainly, as we can not be responsible for errors due to illegible writing.

13. Closing Date: All advertisements must be *received* by not later than the 5th of the month preceding date of issue. (Example: the 5th of May for the June issue. Ads *received* after the 5th of May, *and not later than the 5th of June* will be inserted in the July issue.

FOR SALE

NEW LIST OF MUZZLE LOADING RIFLES. Also cap and ball revolvers for shooting. 3¢ stamp please. Kimball Arms Company, Woburn, Mass. tf

LUGERS, 30-9MM AND 380 PERFECT $65.00 each. Mauser perfect $55.00. Colt automatics 32-380-38-45 like new $50.00 each. Browning 32 good $45.00. Krupp over & under top barrel 16 ga. full under barrel rifle 25-35 side safety lever opening, good condition, $150.00. Frank Pugliese, 1757 So. Broad St., Trenton 10, N. J. tf

GAS CHECKS: .25, .270, 7MM,. .30, 8MM. CALIbers available. $1.10 per 1000 postpaid. R. W. Kampen, 557 Pearl Ave., Rockford, Illinois. 5-46

POWDER MEASURE, BUILD ONE YOURSELF. Inexpensive, adjustable, accurate. Full size drawings and instructions, $1.00. R. S. Truitt, Walcott, Iowa. 5-46

SOLID BRASS CLEANING ROD, BRAND NEW .22 cal., machined tip for patch or brush, 65¢. Finest phosphor bronze bristle brush 15¢, extra, 2 for 25¢. All postpaid. Quantity prices on request. Woodford Mfg. Co., Lyndhurst, Ohio. tf

REVOLVERS, MINERALS, STAMPS, COINS, glass, Indian relics, catalog 5¢. Cowboy Lemly, Las Cruces, New Mexico. tf

ILLUSTRATED 172 PAGE CATALOG OF Antique firearms and edged weapons 50¢. Robert Abels, 860 Lexington Ave., New York 21, New York. 1-47

20 PAGE CATALOG, LISTING ANTIQUE FIREarms, edged weapons, cartridges, tools, parts, books and collectors' items for 15¢. H. A. Brand, 1008 Ingalls Bldg., Cincinnati 2, Ohio. 7-46

INDIAN RELICS, CONFEDERATE BILLS, coins, minerals, gems, fossils, crystals, illustrated catalog 5¢, 100 ancient arrowheads $3.00. H. Daniel, Hot Springs, Arkansas. tf

MUZZLE GUN SUPPLIES: NIPPLES FOR rifles, shotguns, revolvers and muskets—25¢ each or 5 for $1.00. Send old nipple when possible. We carry new stock except in Musket, they are stock of about 1865. Amber flints for rifles and pistols, $1.25 per dozen. 1000 #11 percussion caps, $2.85 FOB. Black powder in F, FF and FFFg, 6¼ pound can $4.00. Comes by freight only. Percussion rifles, shotguns, handguns, write in your wants. Hickory ramrods, 65¢ to $1.25, big variety of sizes. 17A Lyman sights; $2.00. Winchester Vernier type $5.50. New .375 Buhmiller barrels for round ball, turn in 48 inches; with drum and nipple $16.00. These are round and unfinished outside, no breech plug or other accessories; 40 inches long, 1-3/16 O.D. Adjustable black powder measure with funnel $3.50. Nipple wrenches, rifle, pistol, or musket. 75¢. New, laced leather pouches with shoulder strap $6.50. Round ball moulds with wood handles and sprue cutter, $5.50. Main spring vise, 75¢. HACKER MARTIN Kentucky type percussion pistols $37.50. E. M. Farris, 210 Chillicothe Street, Portsmouth, Ohio. tf

FOR SALE—WE BUY, SELL, TRADE SHOTguns, rifles, revolvers, ammunition, outboard motors. Scaramuzzo, 601 So. Halsted, Chicago 7. 3-47

NOISE STOPPING SOFT WAXEN SLEEP-RITE earstoppers make better shooting, better sleeping, set 10¢. Free literature. Raymond Dow, 2922 16th St., Flushing 6, N. Y. tf

LIST OF KENTUCKIES AND OTHER ANTIQUE arms and accessories, 10¢. T. J. Cooper, Rt. #1, Port Royal, Penna. 6-46

RELOADERS: CLOSING OUT, COMPLETE stock of loading equipment, Pacific dies, presses, bullets, primers, scales, powder measures, primed cases etc. Send 3¢ stamp for bargain list. Ned Kailing, 1504 E. Newport, Milwaukee, Wis. 6-46

1849-1851, 1860 CASED COLT REVOLVERS; 1855 Colt revolving rifles and shotguns; list 10¢ in stamps. E. C. Ward, Suite 406 Wilcox Bldg., Los Angeles 12, California. 8-46

M70-K-HORNET, 440 WEAVER, REDFIELD JR., Tilden safety, all very good, large quantity ammunition and components, $155.00. Rifleman, January 1933 to date, eight issues missing $15.00. O. A. Brendal, Detroit Lakes, Minnesota.

30S REMINGTON .257 ROBERTS, EXCELLENT inside, very good to excellent outside, excellent 330 Weaver with Special low Niedner mount, action honed by Niedner ramp front. 48 rear, 50 rounds ammunition $115.00. J. K. Ebersole, Perry Ave., Greensburg, Penna.

7.65 WAFFENFABRIK MAUSER, EXCELLENT. $50.00. Want L.R. primers, Jap 6.5 action, Mauser action. Mauser trigger guards. John Ewing, Box 625, Lamar, Colorado.

TARGET RIFLES AND ACCESSORIES. SPRINGfield National Match, M2's, single shot Popes, Niedner and Sukalle, Schmitt tools, many dies and lead tester. Several Fecker scopes and spotter, complete illustrated list 10¢. Osborne Klavestad, 3638 No. Washburn, Minneapolis 12, Minnesota.

330 WEAVER SCOPE, PERFECT, "B" MOUNTS $26.50. Lou Brault, Howard St., Burlington, Vermont.

WINCHESTER MODEL 54, 30-06, SCOPE, SLING, recoil pad, 2 boxes shells, excellent $125.00. Savage model 99-G, 22 H.P., and .410 ga. barrel, 1 box shells, very good, bluing worn $75.00. Winchester model 12, 16 ga. very good, bluing worn, 4 boxes shells, $55.00. .38 H&R new, $30.00. Vincent Poskin, Onarga, Illinois.

WINCHESTER 70-06 EXCELLENT, WEAVER 330 scope B mounts, 30 rounds ammunition, $150.00. Frank Klugh, Karns City, Penna.

NEW 1946 EDITION OF "THE GUN DIGEST," Authoritative Guide to American and Foreign Rifles, Shotguns, Handguns, Accessories. Not a catalog, an Encyclopedia by America's Leading Gun Authorities. Money-back Guarantee. Mail $1.25 Postpaid. Klein's Sporting Goods, 502E South Halsted, Chicago 7.

30-06 F.A. ARSENAL, 1935 CARTRIDGES, FULL patch, $7.50 per 100. 30-06 Winchester, pointed, full patch, staynless, non-mercuric cartridges, $10.00 per 100. .38 Special factory load, 158 grain, $3.75 per 100. 351 Remington soft point, S.L. cartridges, $7.50 per 100. 25-35 rifle cartridges, Kleanbore, soft point, $7.50 per 100. .38 Cal. Rim Fire revolver cartridges, $2.00 per 100. Super .38 auto pistol cartridges, Rem, Kleanbore, $4.50 per 100. 30-30 rifle cartridges Rem. Kleanbore, soft point, $7.50 per 100. .32 Remington Soft Point rifle cartridges, $7.50 per 100. .38 Special Gallery cartridges, Winchester, black powder, $2.00 per 100. 45-70 blank cartridges, Winchester make, center fire, $4.00 per 100. 44-40 Winchester shot cartridges, $3.50 per 100. .45 cal. Automatic pistol cartridges, $5.00 per 100. 30-40 blank cartridges, late issue factory $8.75 per 100. Forward money with order. No C.O.D. shipments. Public Sport Shops, Dept. R-75, 13 So. 16th Street, Philadelphia, Penna.

P.38 EXCELLENT, EXTRA CLIP, HOLSTER, 50 rounds ammunition $60.00. Walther model PP 7.65 v.g. $35.00; S&W Victory model v.g. $40.00; EE 6x30 Field glasses with case, excellent $40.00; .25 Aeriska long rifle v.g. $25.00; .45 Colt auto number C68 v.g. $75.00. Want .22 Walther, Woodsman, Model B Hi-Standard. Major Smires, FABOC 1, FAS, Fort Sill, Okla.

380 CZECH, LOCKED-BREECH, PERFECT, cartridges, $45.00. Universal 6x30, perfect $55.00. Remington 12 ga. D.B. Hammerless, good $35.00. T. H. Turner, Seaford, Delaware.

2R KRAG LOVELL, SINGLE SHOT, M1 BARREL, scope blocks only, very good $65.00. J. F. Bartlett, 36 Fairfax Court, Huntington 1, W. Va.

COMPLAINT!

"Just one complaint about 'The Arms Chest'—I received too darned many replies to my last ad!"—J. D. Y., Iowa.

PRAISE!

"My advertising in THE RIFLEMAN has been considerably more productive than similar ads in *all* other sporting magazines."

—G. S., Calif.

Two ways of expressing the same important point—that "Arms Chest" ads **do produce results.**

Please remember that your ad copy for July must reach us not later than **June 5th.**

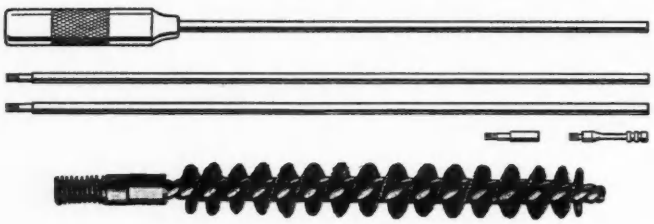
THE MILL-ROSE COMPANY

Manufacturers of finest quality, low priced, Precision Gun Brushes in all popular sizes for rifles, shotguns, and revolvers.

Announces a New Line of

Mill-Rose Gun Cleaning Rods

Fine quality, jointed Duralumin, low priced, for rifles, shotguns, and revolvers.



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Fine Guns

NEED FINE OIL!

Oil your Gun *with* 3-IN-ONE

When thoroughly cleaned, leave a thin film of Light Weight **3-IN-ONE** on all parts and you're ready for the next shoot.

3-IN-ONE *Oil*

HOT & COLD HARDCOAT

For Your Optics

Our new ELECTRONIC process permits hard-coating of SPUN-IN lenses without removal from cells. Coating greatly increases light transmission, definition, and reduces glare. Write for details. Have your rifle scope, spotting scope, binoculars and CAMERA optics improved 20% to 50%.

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5007 M St., Hillside Washington 19, D. C.

CASWELL TARGET CARRIERS GIVE THE shooter every possible point because they hold the target steady and require no exertion to operate. Fully equipped with speedy ball-bearing pulley wheels and target holders for every type of indoor paper rifle or pistol targets. Government Priority not required. Caswell Target Carriers, Anoka, Minnesota. tf

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COLLECTION OF ANTIQUE LONG ARMS, sporting and military. List 15¢. Wm. Locke, 3607 Ault Park Rd., Cincinnati 8, Ohio. 5-46

USE THE NEW GASPROOF GUN WAD FOR mild recoil, close even pattern, unusually long range, $4.00 per M. Packed in 1000 lots 500 ⅜", 250 ½C, 250 thin C, send remittance. E. G. Snyder, R. #2, Reading, Penna. tf

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AMMUNITION—.45-70-500 SMOKELESS, $1.64 per box. $8.00 per hundred. Packing charge 10¢ per box. No C.O.D. shipments. L. L. Bolin, Dept. R, 9 Grand St., South Amboy, N. J. tf

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RIFLE BALLISTICS CHART: 17" X 22", 86 popular loads, 50¢ (no stamps). W. Davison, Wagon Mound, New Mexico. tf

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1946 PRICE LIST, 300 ITEMS FOR ARMS COLlectors, 25¢. House of Guns, Alpine Place, Arlington, N. J. 5-46

THE REVOLVER TIMING RECORD—A 10-INCH RCA-Victor phonograph record. Practice timed and rapid fire anywhere, BY YOURSELF. Nothing to watch—just LISTEN. For dry shooting, basement and outdoor ranges. One side 10 second timing, other side 20 second timing. Plays on any phonograph, $1.50 postpaid. The Original Sight Exchange, Box J, Paoli, Penna. 2-47

NEW SCOPES, MOUNTS, GUNS, RELOADING tools, powder, bullets. Catalog 10¢. Louis Ringuette, Grants Pass, Oregon. 7-46

DO YOU KNOW OF ANY PURCHASABLE antique firearms collections? Generous REWARD for productive information. James Serven, Santa Ana, California. tf

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RALPH H. PHILBRICK'S CURRENT CATALOG of Antique Firearms containing forty sections. 25¢ postpaid. Flintlock Antique Shop, Parker Court, Natick, Mass. 5-46

8MM. 170 GR. SOFT NOSE BT BULLET, HANDloaded ammunition, excellent accuracy, $2.10 box 20; $10.00 per hundred FOB. Ralph W. Jacobi, Buffalo, So. Dak.

4X GERMAN SNIPER SCOPES AND CAPS, 30mm. 4" eye relief $30.00. Mauser actions $25.00. Colt .45 Army v.g. $35.00. P .38, 2 clips, holster, v.g. $50.00. 9mm. Luger, v.g. $40.00. 7.65 Eagle, grip safety Luger, holster, 45 cartridges, v.g. $60.00. .45 auto barrels, $3.00. Magazines $1.00. Enfield extractors, ejectors, firing pins, $1.00 each. 9mm. Beretta v.g. $20.00. 7.65 Beretta, 2 clips, holster new $35.00. Radom 9mm. excellent $45.00. Dreyse 7.65, v.g. $25.00. .45 Colt automatic, (army) excellent $45.00. DuPont powders in stock. N.R.A. targets; write for military list. Aurand's Sportsmen Supply, 229 E. Third, Lewistown, Penna.

.38 MILITARY POLICE 6" EXCELLENT $45.00. Army .45 auto. excellent, reblued, new barrel, arched housing, 6 clips, 290 rounds ammunition $75.00. Lyman 10X Targetspot perfect $75.00. H. R. LaChat, 1026 Dueber Ave. S. W., Canton, Ohio.

WALTHER P .38 FIRED 20 TIMES PERFECT $65.00. G. L. Eden, Member. Lunenburg, Mass.

P .38, VERY GOOD, EXTRA CLIP, SOME CARtridges, $55.00. Lawrence Bour, 1822 Mulberry St., Scranton, Penna.

RIFLE AND SHOTGUN SECTIONAL METAL cleaning rods all calibers and guages, $1.50 each, brushes 25¢ extra. Hoppes gun cleaning pack, consists of oil, nitro solvent gun grease and cleaning patches $1.25. Rifle slings U.S. Army type, 1¼", all leather, used, good condition, $1.00 each. Quick detachable swivels, $1.00 per pair. Recoil boot, brand new, U. S. Army slip-on type, for shotgun or rifle, $1.00 each. Hoosier duck and crow calls treated against tone change, $1.50 each. Hunting license holders heavy green canvas, rust proof pin, 50¢ each. Genuine leather wrist watch straps, tan or black, all widths, val. $2.00-Special 79¢ each. Genuine leather combination wallet and pass case, tan only, $1.00 each. Gents hand carved, all leather western type belt, tan, $1.00 each. Compass directional, all metal, open face, watch type, Mfg. by U. S. Gauge Co. brand new, $1.50 each. Forward money order for goods wanted. No C.O.D. shipments. All items postpaid, Sportsmen's Supplies, 250 West Bayberry Lane, Upper Darby, Penna.

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A LIMITED OFFERING

We are pleased to announce that we have been able to repurchase a very limited number of JOHNSON SEMIAUTOMATIC MILITARY RIFLES, rotary type, Model of 1941, magazine capacity 10 shots, caliber .30-'36, weight approximately 9½ pounds. Accordingly, we are offering these rifles *to members of the National Rifle Association only** as souvenirs of World War II and as Collector's items. Each rifle will be accompanied by a Certificate outlining its background and service during World War II.

JOHNSON SEMIAUTOMATIC RIFLE, ROTARY TYPE M1941

These rifles have been reconditioned and fully testfired, but they are weapons which have seen extended service and are offered as such. Price $250.00

**Send proof of N. R. A. Membership with order*

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Write for general information on our Custom Gun Department.

We specialize in the highest quality of *factory blueing* of any weapon.

Prices:

Rifles	$6.50—8.50
Shotguns	7.50—8.50
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Revolvers	6.50—8.50

MICHIGAN RESORT PROPERTY — HOMES, cottages, resorts, lodges, lake and stream property. Large list 10¢. Sportsmen's Realty Service, 414 Tussing Bldg., Lansing 7, Michigan. 5-46

OUR LIST OF MODERN ARMS WILL BE SENT on receipt of three cent stamp. Kimball Arms Company, Woburn, Mass. tf

AMMUNITION—NEW AND USED SHOTGUNS, Rifles, Handarms. List 10¢. Dept. N. R. Rudolph's, Atchison, Kansas. 12-46

WOODSMAN SPORT MODEL SPECIAL GRIPS, holster 250 rounds ammunition, excellent, $55.00. 12 ga. Belgium Browning, shot 20 times, 30" barrel, 5 shot, 123 rounds ammunition. Canvas case. Excellent except few small scratches, $125.00. Ed. Rose, Chilcoot, California.

REMINGTON MODEL 81, .35 CALIBER, VERY good, oil-finished checkered stock and forend, Whelen sling and detachable swivels, folding leaf and Redfield receiver, $85.00. Two boxes cartridges. E. J. Copps, Jr., 907 W. Green Tree Road, Milwaukee, Wisconsin.

ACTIONS: SHARPS BORCHARDT, VERY GOOD $12.00. Three Farquaharson actions, fair outside very good inside $11.00 each. Fletcher M. Craig, 1420 Sycamore St., Gridley, California.

FOUR MAGNUM SHOTGUNS, DOUBLE BARrels with extras; 10 ga. Ithaca, 12 ga. L. C. Smith, Browning, Superposed, Winchester model 21, $130.00 to $225.00. Winchester single 20 ga. $10.00. Gurley Transit $300.00. All excellent to perfect. No junk. Stamp for descriptions. Edward Anderson, 1041 Boyd Ave, Fresno 2, Californna.

16 GAUGE BELGIUM HAMMERLESS DOUBLE, beautifully engraved, excellent condition, test fired only, 5¾ pounds, automatic ejector for fired shell, beautiful walnut stock. Want $125.00 or trade. Richard Golden, Jewell, Iowa.

30-06 CUSTOM-MADE BULLGUN. EXCELLENT. Heavy octagonal barrel, scope blocks, Winchester 54 speed action. Goss sights. Checkered pistol grip cheekpiece stock. Superb match rifle. Leather case. $170.00. K. E. Newell, 1118 E. 46th, Chicago, Illinois.

PERFECT WINCHESTER 92-25-20 W.C.F. $60.00. Kenneth Richardson, 1007 Locust, Ottumwa, Iowa.

SUPERFINE HAENEL .22 TARGET RIFLE, octagon barrel, ½ Pope rib, falling block, excellent, 8X Fecker scope, Winchester mounts, Wind & elevation open sight, shooting box, 400 Xpert, target sling, $165.00. D. Simmons, 693 Linden Avenue, Ridgefield, N. J.

12 GA. ITHACA, 30" FULL, MODEL 37, NEW $58.00. 20 ga. Savage over-under, 26" F.M. model 420 new $48.50. .38 Special Smith & Wesson M.P. square butt, 4", new $45.50. .22 Hi-Standard model HD military, new $48.50. .22 Harrington & Richardson Sportsman double action new, 500 cartridges Long Rifle $37.00. R. P. Lueddeke, 218 Hawthorne St., Scotch Plains, N. J.

KRAG SPORTER EXCELLENT $55.00 SPORTER stock, swivels, Redfield 102 K rear, Redfield ramp 50 cartridges. A. E. Fortin, 34 Camden St., No. Andover, Mass.

8MM. MAUSER SPORTER, BISHOP STOCK, ramp, Redfield 70, excellent $48.50. .30 Remington 141 perfect, Lyman 56, 40 cartridges, case, $85.00. Want Howe's Gunsmith. Walter Price, 922 Rogers, Okmulgee, Oklahoma.

8MM. MAUSER SPORTER BY KRUPP, EXCELlent in, good out, engraved action, ribbed barrel, D.S. triggers, $75.00. Write for details. 8mm. Mauser Sporter, engraved, poor in, has low bolt, $30.00. 8mm. Belgium Mauser, good $30.00. Czech. Mauser, $20.00. 9mm. Luger 1940, perfect in, excellent out $75.00. Matting punches, Harden and ground $1.00 each. Satisfaction or refund. Harry Creighton 4007 Nevada. Nashville, Tenn.

SHOOT WITH A MUZZLE CAP ON YOUR rifle, shotgun, pistol and play safe. Positively keeps bore of firearm free of dirt, moisture, snow, dangerous obstructions under all firing conditions, range or afield. Simple to use. No effect accuracy, breech pressure. Made of Neoprene. This sensational gadget, endorsed everywhere, makes ideal scope cover also. Shooters! Get your seasons supply by return mail, 35¢ dozen, postpaid. State whether for rifle, pistol, shotgun, scope. Woodford Mfg. Co., Lyndhurst, Ohio. tf

WESTERN S.P. AMMUNITION, FRESH STOCK 38-40 $2.16, 32-20 $1.95, and others. Write for prices. DuPont powders, 4350, 4064, 4320, 4227. 4198, 3031 $1.60. #6, 4759, $1.00. Tri City Gun Shop, Bristol, Virginia.

A. C. I. 93—80

Pat. applied for

Already proven a dependable gun "cleaner & rust preventive".

- Easy to use, removes all powder residue, and leaves a perfectly clean bore.
- Can be used both inside and out, as a preservative.
- Besides being a cleaner, comparative tests show it to be as good as any thin oil intended only for protection against rust.

4 oz. for $.40

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A brochure of historic significance essential to all arms collectors, gun enthusiasts and riflemen. Reprinted from ARMY ORDNANCE. Paper covers. $1.00 a copy.

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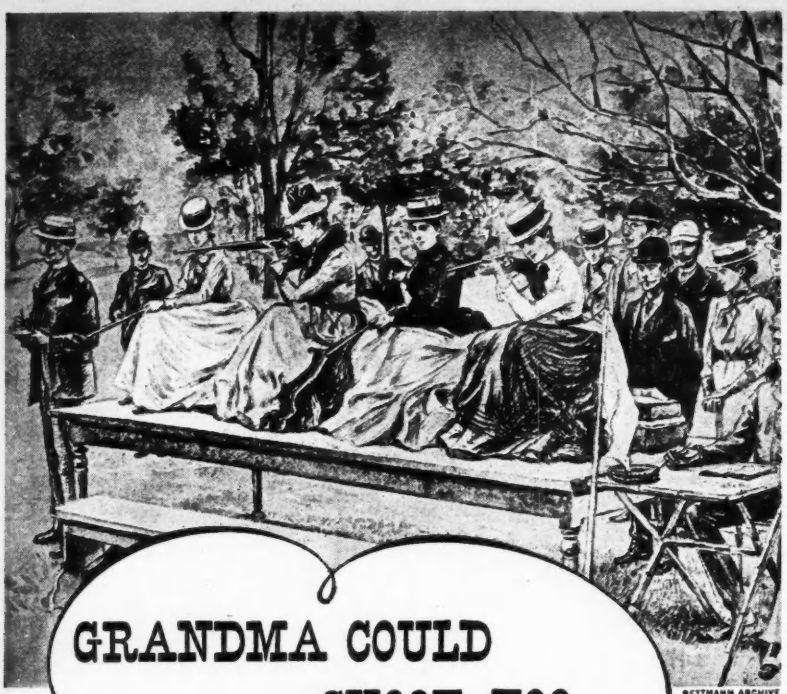

BETTMANN ARCHIVE

GRANDMA COULD SHOOT, TOO...

Even back in the 1870's grandmother could shoot—straight as black powder, homemade ball, and crude rifles would permit. Of course, she didn't go in for modern shooting positions, but contented herself with this sedate "plush-pillow-on-table-top" position.

She'd have been amazed at present-day precision rifles, and commercial cartridges loaded with Hercules sporting powders. With chemically and ballistically stable Hercules powder she could have called her shots every time.

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INCORPORATED

980 King Street, Wilmington 99, Del.

HERCULES SPORTING POWDERS FOR BETTER ACCURACY

XS-62

STOCK BENDING...
a PACHMAYR specialty!

More or less drop, on your favorite rifle or shotgun, to your specifications.

SATISFACTION GUARANTEED!

Write today for descriptive folder.

Pachmayr Gun Works
1220 So. Grand Ave., Los Angeles 15, Calif.

NOSKE 4X SCOPE, EXCELLENT, $45.00. COLT Officer's Model .38 Special, perfect $45.00. Want: 100 & 130 gr. .270 bullets and factory cartridges. 93 gr. Luger bullets. William Heupcke, Sugarloaf, Penna.

WINCHESTER 52 HEAVY BARREL WITH sights, very good $75.00. Colt 25 automatic, excellent, $20.00. Merit Target disc, excellent, $2.50. J. L. Polk, Osborne Road, Loudonville, N. Y.

FIREARMS COLLECTION OF OLD AND modern handguns. All in top collectors condition. Approximately 300 guns offered including the scarce foreign arms. Complete lists 25¢ coin. Arthur D. Leidesdorf, Elberon, New Jersey. 6-46

.300 SAVAGE MODEL 99EG, CHECKERED stock, sling, fired only 50 times, excellent condition. 2½ boxes shells, $75.00. H. K. Huiras, Woodburn. Oregon.

K22 GOOD $45.00. K22 VERY GOOD TO NEW $65.00. New Nydon scope $25.00. W. W. Price. Charleston, W. Va.

SAVAGE 22 H.P. VERY GOOD, PEEP SIGHTS, with 5 boxes cartridges $65.00. Walter Eagle, R. D. #2, Elizabethtown, Penna.

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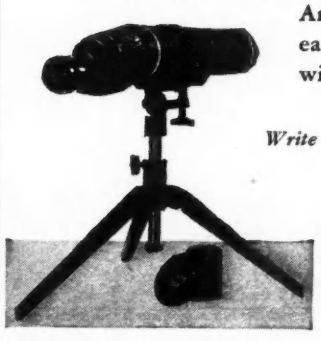

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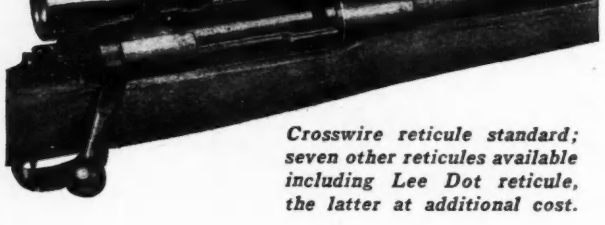

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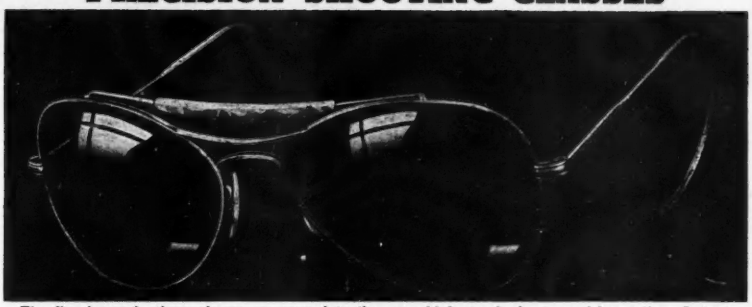

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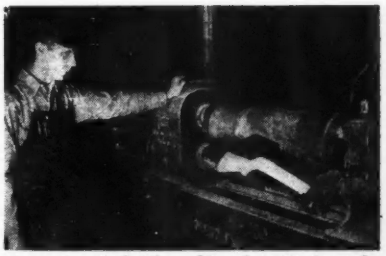

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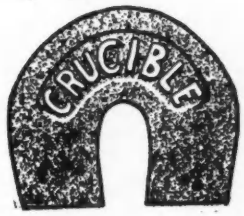

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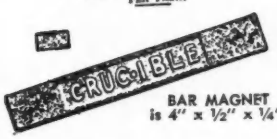

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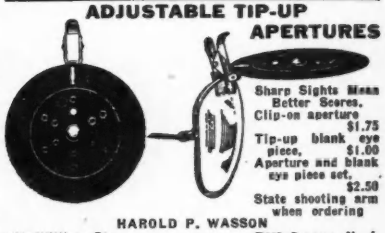

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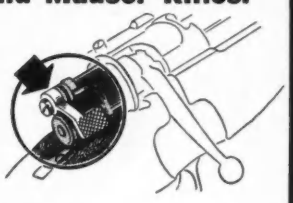

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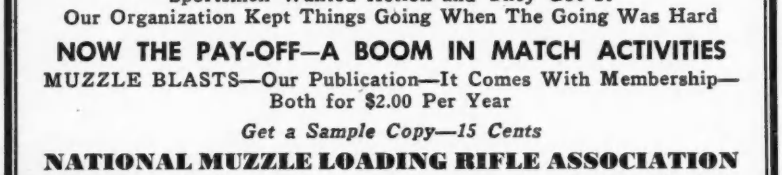

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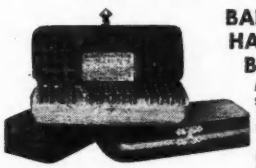

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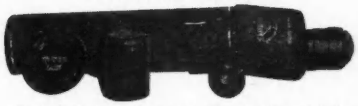

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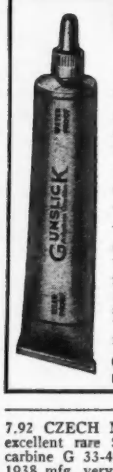

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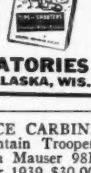

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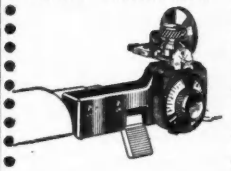

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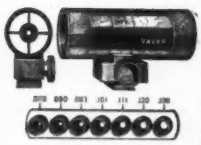

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PISTOLS—REVOLVERS, LUGERS 9MM. AND 30 Caliber holsters & extra magazines $70.00. Mausers, Walthers, P.38, Beretta 25, 32's & Colts $60.00. Revolvers Colts Smith & Wesson, 32 & .38 $55.00. All like new, Hi-Standard, .22 $60.00. Frank Pugliese, 1757 So. Broad St., Trenton, N. J.

W70 220 SWIFT, MEDIUM HEAVY BARREL. Jostam cheekpad, fired 172 rounds, excellent; 12X Super Targetspot, dot reticule, excellent; 200 primers, 200 bullets, Pacific tool, complete, $250.00. New Fox Sterlingworth 12 gauge double, 28 F&M $66.50. New Iver Johnson 12 and 16 gauge singles, 30 full, $14.75. New Hi-Standard HDM 22 automatic pistols, 4½ or 6½" barrels, $49.50. New Crossman .22 caliber air rifles, $16.50. New Mercury 35mm. candid camera, 3.5 lens, $65.00 plus tax. New Universal 6x30 binoculars, coated lenses, case, $85.00 plus tax. Connie's, South Deerfield, Mass.

COLT SINGLE ACTION 41 CALIBER 3¾" Frontier, reblued, good $38.00. Colt Lightening .38 caliber single action, nickel finish, pearl grips, very good, 100 long Colt cartridges, $36.00. S.W., .38 caliber single action tip-up, nickel finish, 4", very good, $20.00. Pair S. W. 32 caliber rim fire military revolvers, 6", very good $40.00. Zeiss "Zielvier" scope 10½ long $75.00. Mannlicher-Schoenauer 6.5 cal. excellent, sling, full stock carbine $115.00. Another, very good $85.00. One in 8mm. with full stock cut down 9", excellent $100.00. Mauser action and barrel, Waffenfabric Obendorf 1906, $33.00. Another from this war, no name $23.00. Nambu automatic, excellent, 10-8mm. cartridges, $65.00. 8mm. Lebell soft point ammunition $12.00 per hundred. Genuine U. S. Ranger's sword blades only. Fine blue steel, can be used for many things $1.25 each. Package of ten in original packing $9.50. No C.O.D. money return guarantee within one week. Morton's, 40 Fulton Street, New York 7, New York.

.300 SAVAGE MODEL 1920, V. G. $60.00. ACtions: 44½ Stevens v.g. $25.00; Hepburn v.g. $25.00; Lowall Winchester good $10.00; Ballard, incomplete $10.00; Rider, heavy, v.g. $10.00; Rider, light, good $5.00; Winchester 1892 good $8.00. Pistols: S&W .32 S. A. v.g. $16.00; Remington .38 S.A. good $15.00; Remington Smoot .32 r.f. good $13.00; Remington .44 C&B poor $8.00; Hopkins & Allen XL .32 r.f. v.g. $10.00; Spanish auto fair $2.00. For parts: Remington model 24, $4.00; Model 12, $2.00; Marlin mod. 20. $2.00; S&W Navy .44 D.A. $3.00. Misc.: 1899 Savage 250-3000 barrel excellent $5.00; M. L. Shotgun, poor $2.50; Winchester 1892 frame, S. S. .22 rifles, fair $1.50 each. Otto Wolhowe, Verendrye, North Dakota.

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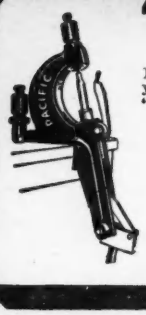

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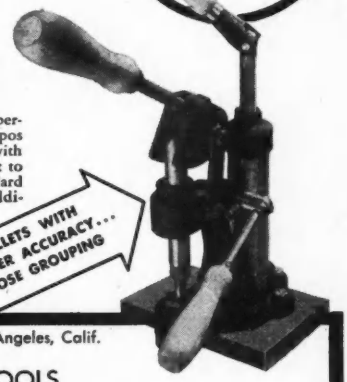

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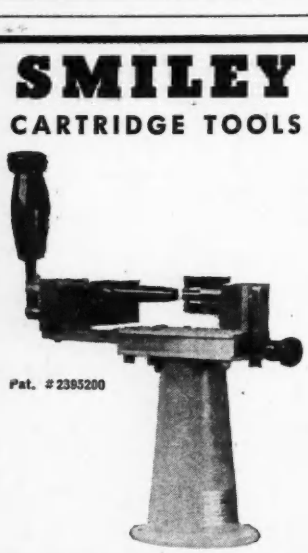

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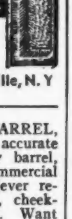

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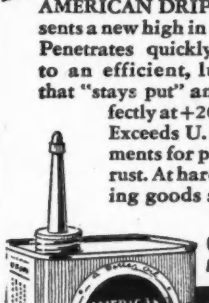

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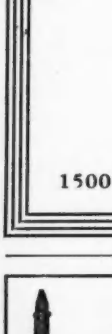

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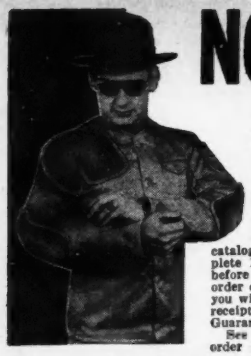

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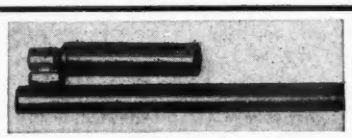

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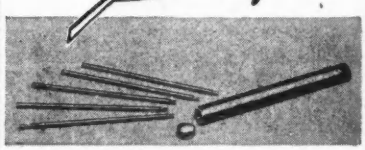

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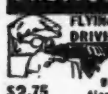

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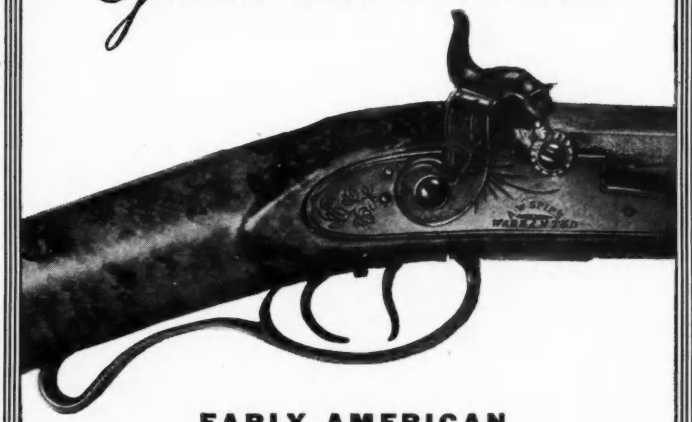

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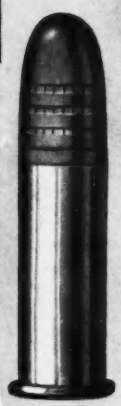

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